

ARMY WINGS

A HISTORY OF ARMY AIR
OBSERVATION FLYING 1914 - 1960



ROBERT JACKSON

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AVIATION

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DEDICATION

TO CAPTAIN RAY COLES
DFC, RA

CHAPTER ONE

THE FIRST AOPS:

AIR OBSERVATION POST

KITES, BALLOONS AND AIRCRAFT PRIOR TO 1914

Over the centuries, virtually every major technological advance known to mankind has found an application in warfare, or indeed stems from warfare itself. As far as it is known – although this is something of a grey area, for most of our knowledge of the scientific inventions of the ancient civilizations that bordered the Mediterranean was lost forever with the destruction of the Library of Alexandria – the Chinese were the first to invent primitive flying machines in the form of kites, and according to documented history it was the Chinese who were the first to use them in war. In 206 BC, the Chinese General Han Hsin used a kite to calculate the distance between his forces and the palace of Wei Yang Kong, situated in the town he was besieging, and in 549 AD the defenders of the town of King Thai, besieged by enemy forces, used kites to send out calls for help to neighbouring villages, using a form of signalling not unlike semaphore. Chinese man-lifting kites, described by the Venetian explorer Marco Polo in the 14th century, may have been used for military observation purposes, but there is no firm documentation of this.

Four centuries later, when François Pilatre de Rozier became the first man to be carried aloft in a tethered Montgolfier hot-air balloon on 15 October 1783, at least one man who witnessed the event was convinced that balloons had a military potential. On 21 November 1783 – by coincidence, the day on which de Rozier and the Marquis d'Arlandes made the world's first aerial journey in a free-flying balloon – Benjamin Franklin, then serving as American envoy to France, observed that an army could employ balloons for functions such as 'elevating an engineer to take a view of an enemy's army, works etc, conveying intelligence into or out of a besieged town, giving signals to distant places, or the like'. In January the following year, he wrote that the balloon's potential in warfare was 'of great importance, and what may possibly give a new turn to human affairs...Five thousand balloons, capable of raising two men each, could not cost more than five ships of the line; and where is the prince who can afford so to cover his country with troops for its defence as that ten thousand men descending from the clouds might not in many places do an infinite deal of mischief before a force could be brought together to repel them?'

It would be many years before Franklin's prophetic vision of military aviation became a reality in his native North America. In the meantime, it was

France who found a practical military application for the balloon, as a powerful Allied coalition sought to destroy the embryo armies of the Republic in the wake of the French Revolution.

The world's first military aviation unit, intended for air observation, was La Première Compagnie d'Aérostiers Militaires, formed on 2 April 1794 at Chalais-Meudon, near Paris, by decree of the Committee of Public Security. The company was commanded by Captain Coutelle. Its first balloon was *L'Entreprenant*, its envelope constructed by a team of seamstresses in the main hall of nearby Meudon manor, which later became the site of France's national air museum. On 2 June *L'Entreprenant* was deployed to Meubeuge, Belgium, for use by the French Republican Army against the Austrians. The first operational ascent was made on 26 June, when Captain Coutelle carried out a series of observations of Austrian forces manoeuvring on the battlefield of Fleurus. Coutelle was airborne for a total of ten hours and was accompanied later in the day by the French commander, General Jourdan. Their observations made a vital contribution to the French victory and the aeronauts escaped unscathed, although the Austrians tried hard to shoot down the balloon with a 17-pounder cannon – the world's first anti-aircraft gun.

The hydrogen-filled *Entreprenant* had been hauled from Meubeuge to Fleurus, a distance of about 40 miles (64km) in a fully inflated condition. Two balloon companies were eventually attached to the Republican Army, but were disbanded in 1799. No more than four balloons were ever operational. The two-man crew transmitted messages to the ground by means of semaphore, luminous balls hung on the basket or written information slid in sandbags down the mooring cable. Three balloons were deployed to Egypt during Napoleon's campaign of 1798, but were soon destroyed by British forces. In any case, Napoleon showed scant interest in this new adjunct to his military campaigns and no further use was made of it.

Nearly half a century later, during the Seminole War of 1841, when the US Army was engaged in a protracted fight with the Seminole Indians in the Florida Everglades, Army Colonel John Sherburne suggested to Secretary of War Joel Poinsett that balloons might be sent up at night to detect Seminole campfires, so that the Indian camps could be pinpointed and attacked by infantry columns. The idea was rejected out of hand by General W.K. Arminstead, the US commander in Florida.

On 10 June 1859, the French balloonist Eugène Godard began a series of tethered ascents in a Montgolfier-type hot-air balloon to observe Austrian troop movements during the Battle of Solferino. His observations lasted until 24 June, when the Austrians were defeated by French and Sardinian forces.

On 19 April 1861, four days after the outbreak of hostilities in that bloody conflict that was to become known as the American Civil War, two members of the Rhode Island 1st Regiment (State Militia), James Allen, a veteran balloonist, and Dr William H. Helme, a dentist and aeronaut, transported two of Allen's balloons from Providence, Rhode Island, to Washington, where on 9 June they made the US Army's first trial captive-balloon ascent. Allen left the

army after the accidental loss of both his balloons in July 1861 at Falls Church, Virginia, but rejoined in March 1862 and served until June 1863.

Another aeronaut, John Wise volunteered his services to the Union Army and was commissioned to build the army's first balloon, which was delivered to Washington on 21 July 1861 and detailed to be used for observation in the Battle of Manassas, which was then in progress. A ground crew walked the balloon, already inflated, to Fairfax Ford across the Potomac, where it was attached to a wagon. Unfortunately, the balloon became snagged in some roadside trees and holes were torn in it, rendering it useless. It was quickly repaired and, on 24 July, it made ascensions at Arlington, Virginia. Two days later, while under tow, it was blown against some telegraph wires, which cut the towropes. The balloon drifted towards the Confederate lines and was shot down by Union troops to prevent its capture.

In May 1861 yet another aeronaut, John La Mountain, twice offered his services, two balloons and a portable gas generator to the Union Army. The War Department ignored him, but on 5 June Major-General Benjamin F. Butler, in command of the Department of Virginia, offered La Mountain a job as an aerial observer. The aeronaut made his first military captive ascent in his balloon *Atlantic* on 25 July, but a strong wind made it impossible for him to attain the altitude necessary for observation. However, six days later he was able to rise to 1400 ft (430m) and observe the territory within a radius of 30 miles (48km) around Hampton. He reported that the Confederate forces were much weaker at this point than had been supposed.

On 3 August La Mountain's balloon was moored to the transport *Fanny* and carried out into the Channel of the Potomac river, from where it made the Army's first ascent from a boat. Subsequent ascents disclosed new Confederate fortifications, with guns trained on Fortress Monroe and shipping in Hampton Roads. After a trip north to get his larger balloon, the *Saratoga*, La Mountain was transferred to the Army of the Potomac. On 4 October he began a series of free ascents from Brigadier-General W.B. Franklin's headquarters at Cloud's Mill. These free flights were made possible because of a prevailing east wind, which carried the balloon over the Confederate forces located to the west of the Union Army, and a westerly wind at higher altitude, permitting it to return. After completing his observations, La Mountain jettisoned some ballast, letting the balloon rise until it encountered the eastbound current of air which carried him back over his own lines, then released gas until the balloon came down. The major difficulty which La Mountain experienced was lack of control on landing, and there were problems with 'friendly fire'. On 18 October, after returning to the Union lines, he descended in the middle of Brigadier-General Louis Blenker's German Brigade, and was greeted by a volley of shots that riddled the lower part of the balloon's envelope.

On 16 November 1861 the *Saratoga* was blown from its moorings and lost over the Confederate lines. That left La Mountain with only the old *Atlantic*. Unsuccessful in his attempts to obtain another balloon from a rival aeronaut, Thaddeus S.C. Lowe, with whom he quarrelled, he left the service of the Army in February 1862.

Thaddeus Lowe was to become the most important of the Civil War aeronauts. On 20 April 1861, preparing for a transatlantic attempt, he took off from Cincinnati on a practise flight and landed at Unionville, South Carolina in Confederate-held territory. Lowe was at first thought to be a spy, but was later recognized and released. He immediately offered his services and those of his balloon, *Enterprise*, to President Abraham Lincoln. On 18 June he carried out a demonstration in Washington, during which he transmitted a telegraph message from the balloon to President Lincoln. The President instructed a reluctant General Winfield Scott, commander of the Union Army, to employ Lowe's services in developing balloons for military use.

Meanwhile, aeronaut John Wise, from Pennsylvania, had also volunteered his services. In 1846, during the war between the United States and Mexico, Wise had suggested using a balloon to drop 'a thousand percussion bombshells' on the fort of San Juan de Ulloa at Veracruz, whose gun batteries were holding up the advance on Mexico City of American forces under General Winfield Scott. The idea was ignored by the War department, and the fort eventually succumbed to a land assault.

Now, fifteen years on, John Wise's services were accepted, as were those of a third aeronaut, James Allen. Wise and Allen were placed at the disposal of Brigadier General Irvin McDowell, commanding the main US field army. The first operational ascent was made by James Allen on 19 June and, although early operations were beset by mishaps, Wise succeeded in observing the Confederate lines and obtained useful reconnaissance information on 24 July, following the Union Army's defeat in the first Battle of Bull Run. Several days later, however, Wise's balloon broke free of its moorings and had to be shot down. Disillusioned, Wise gave up ballooning and became a cavalry officer.

On 2 August 1861 Thaddeus Lowe and the men of the embryo Balloon Corps received orders to build the US Army's first balloon, the *Union*. Lowe made his first operational ascent in his balloon on 24 September, using his aerial telegraph to direct artillery fire. On 1 October 1861 the First American Army Balloon Corps was officially formed

Thaddeus Lowe ascending in one of his balloons during a demonstration flight.

Smithsonian

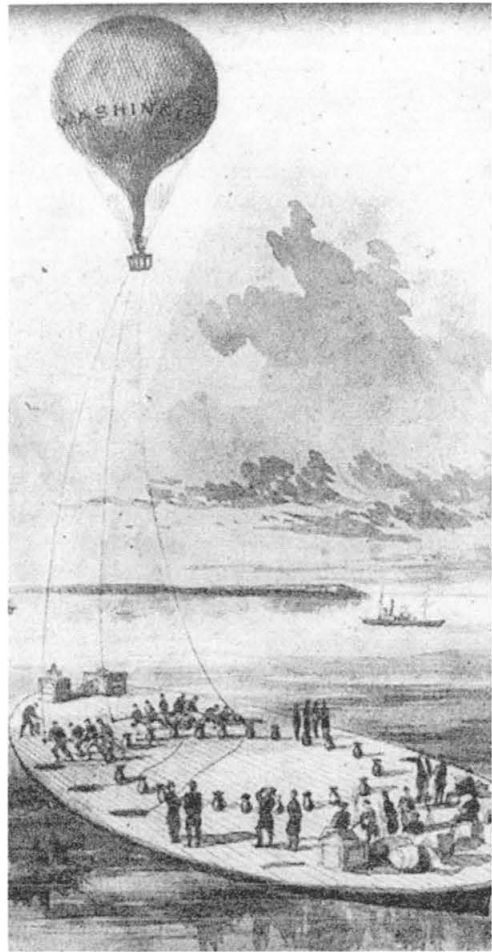


under the command of Thaddeus Lowe, who was now designated Chief Aeronaut of the Army of the Potomac, with a complement of 50 men. By the end of the year the Corps had five balloons, the *Constitution*, *Intrepid*, *Union*, *United States* and *Washington*. Two more, the *Excelsior* and *Eagle*, were added to the strength early in 1862. From November 1861, a converted coal barge, the *G. W. Parke Custis*, was used to transport and tow observation balloons along the Potomac River; with some stretch of the imagination, it may be said to have been the world's first aircraft carrier.

On 31 March 1862 control of the Balloon Corps was transferred to the Quartermaster Corps, a move that led to increasingly severe logistical and administrative difficulties. Though successful in the field, the Balloon Corps never had a proper place in the Union Army's command structure. The aeronauts were never given ranks, they received inadequate and infrequent pay, and the Corps' horses and wagons were often commandeered by the Quartermaster Corps. Despite the problems, the Balloon Corps proved its worth time and again, especially in directing artillery fire. In May and June 1862, the *Intrepid*, *Washington* and *Constitution* were used in support of General George B. McClellan's Peninsula Campaign, notably at the Battle of Seven Pines (Fair Oaks). Their observation activities always attracted heavy enemy fire, but no balloon was lost through enemy action.

The Confederate forces, always lagging behind the Union in the technology of warfare, operated one balloon briefly in the spring of 1862. The Confederate General James Longstreet described how it came about:

The Federals had been using balloons in examining our positions, and we watched, with envious eyes, their beautiful observations as they floated high up in the air, well out of range of our guns. While we were longing for the balloons that poverty denied us, a genius arose for the occasion and suggested that we send out and gather silk dresses in the Confederacy and make a balloon. It was done, and soon we had a great



The world's first aircraft carrier: the coal barge George Washington Parke Custis towing the balloon Washington on the Potomac River. Smithsonian

patchwork ship of many and varied hues which was ready for use in the Seven Days' Campaign.

We had no gas except in Richmond, and it was the custom to inflate the balloon there, tie it securely to an engine, and run it down the York River Railroad to any point at which we desired to send it up. One day it was on a steamer down the James when the tide went out and left the vessel and balloon high and dry on a sand bar. The Federals gathered it in, and with it the last silk dress in the Confederacy. This capture was the meanest trick of the war and one I have never yet forgiven.

The American Army Balloon Corps, on the other hand, now had portable hydrogen-making equipment. On 11 December 1862 one of Lowe's balloons was used to assist Union forces in their successful crossing of the Rappahannock river, the prelude to the costly Battle of Fredericksburg.

On 7 May 1863 the American Army Balloon Corps was transferred again, this time to the Corps of Engineers, and a 40 per cent salary cut was imposed. Lowe resigned in protest, and the Balloon Corps was disbanded. Lowe himself had made over 3000 operational ascents over the past two years. It would be three decades before the US Army once again showed an interest in military aviation.

The use of balloons for military purposes, however, was becoming firmly established, albeit in some rather unusual places. On 18 March 1865, for example, war broke out between Paraguay and an international coalition comprising Argentina, Brazil and Uruguay; observations were used extensively in this bitter and bloody conflict, which ended on 1 March 1870 with the devastation of Paraguay.

Between September 1870 and January 1871, during the Franco-Prussian War, sixty-six balloon flights were made out of Paris, which was under siege by Prussian forces, to unoccupied territory. The balloons carried a total of 110 passengers, more than two and a half million letters, and carrier pigeons to fly back into Paris bearing despatches. The first flight, on 23 September 1870, was made by Jules Durong, carrying despatches. After a three-hour flight over Prussian-held territory, he landed at Evreux. The early flights from Paris were made by skilled aeronauts, but later missions were undertaken by French navy personnel, specially trained for the task. Five balloons and their occupants were captured by the enemy; of the



A memorial to the aeronauts of the Paris siege, erected in the Place des Ternes, Paris, in the late 19th century.

others, two were lost in the Atlantic and one came down in Norway, after a flight of 14 hours 40 minutes. The flights ceased on 28 January 1871.

While the balloon flights out of Paris – the first airlift in history – had been something of an epic, it was clear that the venture would have been a greater success if the aeronauts had been able to steer their craft. The experience gave impetus to the idea of building a dirigible balloon – in other words, an airship.

Great Britain entered the field of military aeronautics with the establishment of an Army Balloon Equipment Store at Woolwich in 1878, the year in which the War Office allocated £150 for the construction of a balloon. Captain J.L.B. Templer of the Middlesex Militia, a qualified aeronaut and the owner of a balloon named *Crusader*, and Captain H.P. Lee of the Royal Engineers were placed in charge of development work. Templer therefore became the first British air commander, and his *Crusader* the first balloon to be used by the British Army, in 1879. The first British military aeronauts were Lieutenant G.E. Grover and Captain F. Beaumont, both of the Royal Engineers, who had been attached to the American Army Balloon Corps in 1862–3. The first balloon specifically designed for the British Army, using coal gas fuel and named *Pioneer*, was constructed in 1879. It cost £71 from the initial allocation of £150.

The British Army used a man-carrying observation balloon for the first time on 24 June 1880, during military manoeuvres at Aldershot, Hampshire. During the course of that year, a Frenchman named Arthur Batut carried out experiments in aerial photography, using kites; air photographs had been taken before this, notably by the American Army Balloon Corps during the Civil War, but this was the first time anyone tried to devise a systematic technique.

On 26 November, 1884, a balloon unit attached to the Royal Engineers left England to take part in an expedition to Bechuanaland (present-day Botswana). The balloon created an enormous impression. In the words of one native chief: “If the first white men who came into this country had brought a thing like that, and demanded that we should worship and serve them, we should have done so. The English have indeed great power.” The expedition reached Cape Town on 19 December. A second Royal Engineers’ balloon accompanied an expedition to the Sudan, leaving England on 15 February 1885. In 1892 the Royal Engineers Balloon Depot was given a permanent base at Aldershot and a school of ballooning founded there. The factory produced its first balloons in 1893. A second balloon factory was established at South Farnborough, Hampshire, in 1894.

In the United States, there were no military balloon operations between 1863 and 1890. Then, on 1 October that year, Congress gave the US Signal Corps the task of collecting and transmitting information for the army. In 1891 the Chief Signal Officer, Brigadier-General Adolphus V. Greely, asked for funding to develop a balloon corps, and in 1892 a balloon section was established in the Signal Corps. Meanwhile, Lt William A. Glassford had been sent to Europe to study balloon developments there, and in 1893 he returned

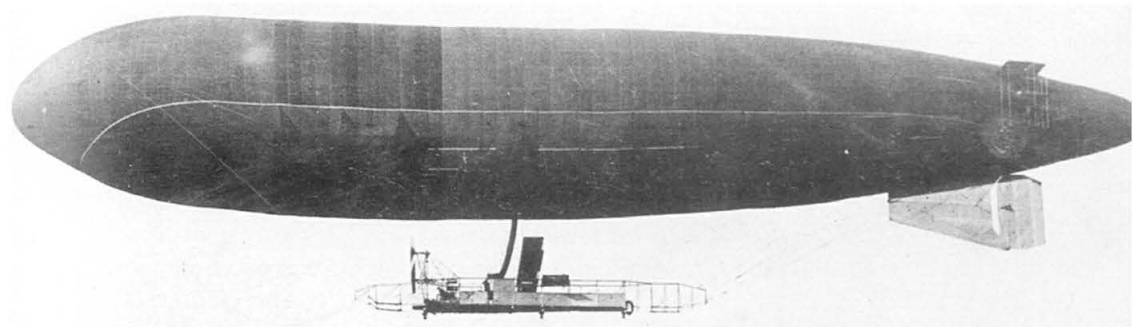
to the US with a small French balloon, the *General Myer*. It was exhibited at the Chicago World's Fair, making several hundred ascents, and a telephone was used to communicate between the balloon and the ground. It was subsequently sent to Fort Logan, Colorado, where Glassford (now a captain) developed a balloon section as part of a Signal Corps telegraph train. Unfortunately, the *General Myer* was destroyed in a gale, so Glassford ordered a new one to be built by a carnival aeronaut named William Ivy (better known as Ivy Baldwin), who had been hired by General Adolphus Greely and given the rank of sergeant. Made of silk, the new balloon was constructed by Ivy and his wife.

In May 1898, war broke out between the United States and Spain over the latter's brutal domination of Cuba, and Ivy's balloon was sent to the Caribbean island with Signal Corps Lieutenant-Colonel Joseph E. Maxfield in support of an American expeditionary force. Maxfield's 'balloon company' comprised twenty-seven men, including Sergeant Ivy. They arrived at Santiago, Cuba, in June 1898 with a damaged balloon and no hydrogen generator. Ivy repaired the balloon, filled it with bottled hydrogen, and after several tentative ascents used it to confirm the presence of the Spanish fleet in Santiago harbour on 30 June. The next day, he and Maxfield helped direct artillery fire and observe the Spanish positions during the American assault on San Juan Hill. Towards the end of the day the balloon, with only Ivy aboard, was badly holed by enemy fire and dropped into the water. Ivy survived and lived until 1955, with the dubious distinction of having become the first pilot in history to be shot down in war.

The Signal Corps operated a number of balloons in the early years of the twentieth century, carrying out experiments with balloon photography and with radio receivers. In 1908 a small airship, known as Signal Corps Dirigible No 1, was also acquired, and on 26 May 1909 Lts Lahm and Foulois became the US Army's first airship pilots during an ascent in this craft.

During the Boer War of 1899–1900, three balloon sections of the Royal Engineers were sent to South Africa in support of the British Army. The first unit to see action was the 2nd Balloon Section under Major G.M. Heath, which was deployed to Ladysmith and came under siege for four months with the garrison there. The balloon continued to operate for a month before its supply of hydrogen ran out.

The 1st Balloon Section, under Major H.B. Jones, joined Lieutenant-General Lord Methuen's advance on the Modder River, culminating in the battle of Magersfontein. It was sent up to the front by railway and could have been used for aerial reconnaissance of the enemy's trenches before the battle started, but Methuen neglected to issue the necessary orders, with the result that his forces were committed to action with no real knowledge of the enemy's trench systems. The British suffered heavy casualties, which would certainly have been heavier still if balloon observation had not detected enemy movements during the battle itself. Observation balloons were also used to reconnoitre the terrain ahead of the British advance



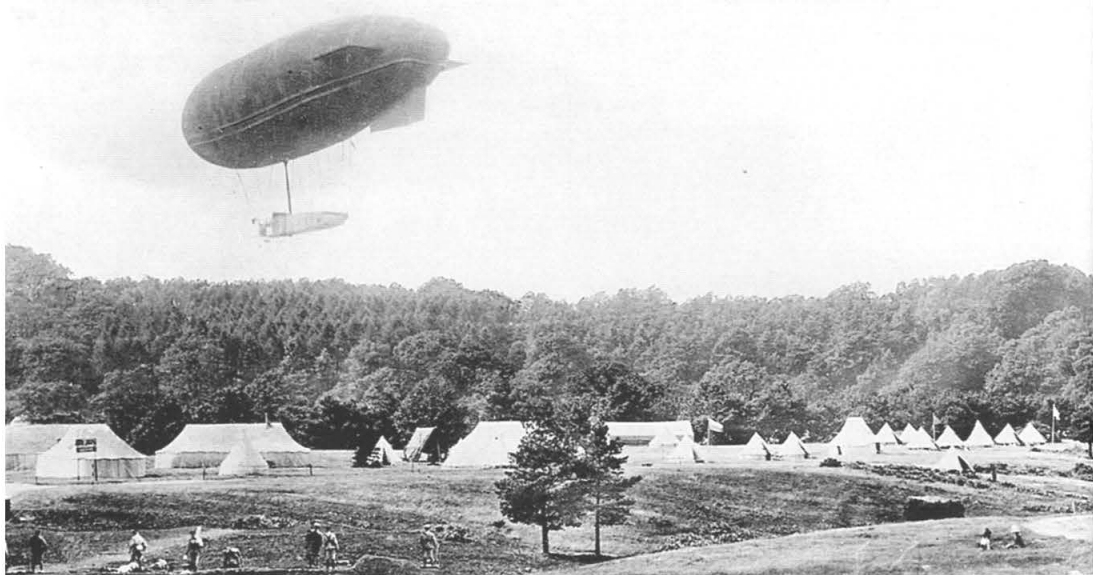
The Clement-Bayard series of airships, one of which is seen here, was widely used by the French military for observation purposes. Author's collection

on Pretoria in May–June 1900. The activities of the British ‘war balloons’ persuaded some British officers that aerial reconnaissance was a valuable asset, although others remained convinced that scouting by cavalry remained the best method.

Although the first decade of the 20th century saw amazing advances in the development of heavier-than-air machines, it was the airship – or dirigible balloon, to give it its correct title – that dominated the skies. The French were leaders in the field, and lost no time in putting airships to use for military purposes. On 17 October, 1905, during a flight in the dirigible *Lebaudy II*, French aeronauts Richard and Bois dropped dummy bombs and took photographs of various objectives in a demonstration for military observers, and two days later the same airship made an observation flight over the military stronghold at Toul in a mission lasting 2 hours 31 minutes and covering 31 miles (49.6km). The crew, Juchmès, Rey and Voyer, were accompanied by General Pamard. On 24 October the airship made a flight from Toul with the French War Minister, M. Berteaux, on board. *Lebaudy II* was subsequently purchased by the French Army and was the first of a line of Lebaudy military airships.

On 10 September 1907 Britain’s first Army airship, the Dirigible No 1 *Nulli Secundus*, made its first flight from Farnborough golf course. The crew were Colonel John Capper, Royal Engineers, commandant of the Balloon Factory, Captain W.A. de C. King, the Balloon Factory’s adjutant, and Samuel F. Cody, the first man to make a powered heavier-than-air flight in Britain, who had been commissioned to install the ship’s 50hp Antoinette engine and to design the gondola and steering gear. The airship flew for 1,000 yards (914m). It was destroyed in a storm on 5 October after making a flight over London, and was rebuilt as the *Nulli Secundus II*.

On 3 July 1909 the German Army took delivery of its first Zeppelin airship, the LZ.3, at Metz. It was used as a training airship for most of its career. Count Ferdinand von Zeppelin’s prototype rigid airship, the LZ.1, had first flown at lake Constance on 2 July 1900. The first Zeppelin ordered by the German Army was LZ.4, but it crashed after escaping from its moorings on 5



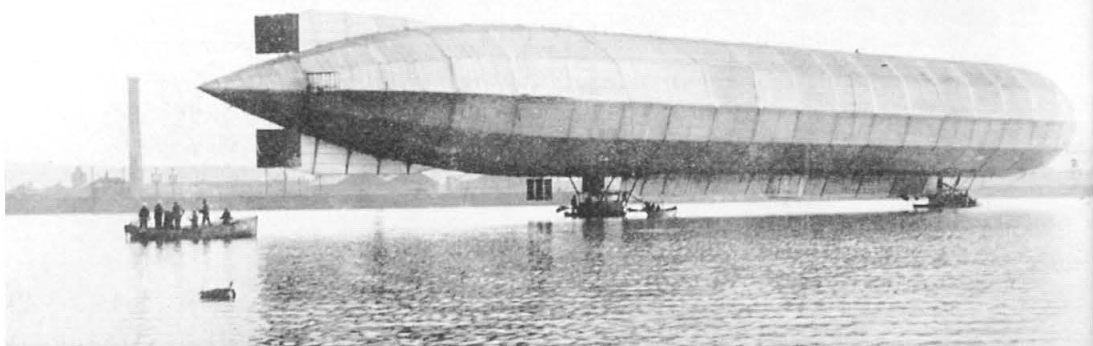
One of the first British military airships was the little Beta, seen here over Farnborough Common in 1910. Author's collection

August 1908 and LZ.3 was pressed into service instead before it could begin a planned series of operational trials.

On 30 October 1909 the German non-rigid airships *Parseval I* and *Gross-Basenach II*, together with the German Army Zeppelin Z.2 (LZ.5), carried out a simulated attack on a fort near Koblenz during military manoeuvres. Major von Parseval was the leading designer of non-rigid airships in Germany before the First World War, beginning work in 1906. In all, twenty-seven were built. The *Parseval* was the first airship to be exported successfully, several being supplied to foreign services, including one to the Royal Navy.

The day of the aircraft, however, was fast arriving. On 10 February 1910 the French Army took delivery of its first heavier-than-air machine, a Wright biplane, at Satory near Versailles. General Roques, in charge of military aviation, launched a campaign to recruit pilots; the artillery provided three men, the infantry four, and the cavalry rejected the request with disdain! In June that year, France's *Aéronautique Militaire* carried out its first operational mission when Lieutenant Féquant and his observer, Captain Marconnet, flew from Chalons to Vincennes and took aerial photographs from a two-seater Blériot.

The Mayfly was Britain's first rigid dirigible. It never flew, breaking its back as it was towed from its shed at Barrow-in-Furness. Author's collection





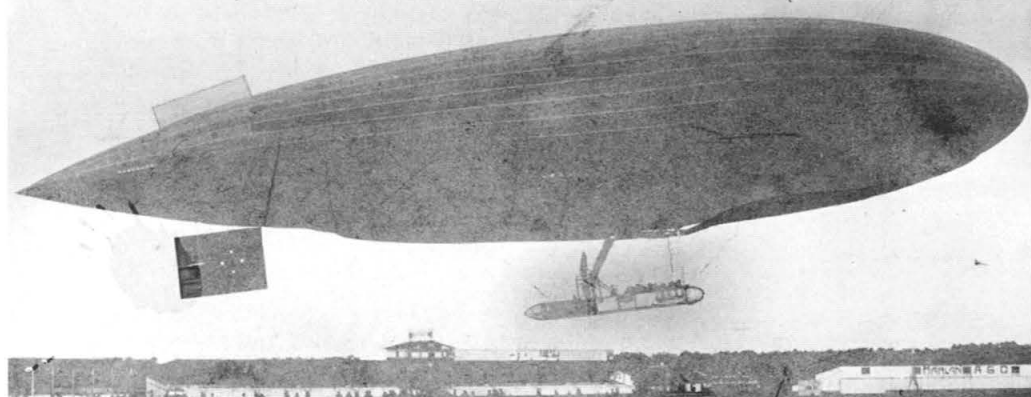
The Germans had their troubles, too! This photograph shows an early Zeppelin airship, the Deutschland, in a bad way as the result of a south-westerly gale in May 1911. Author's collection

On 1 April 1911, the Air Battalion of the Royal Engineers was formed at Larkhill, Wiltshire, under the command of Major Sir Alexander Bannerman. It consisted of two companies: No 1 (Airship, Balloon and Kite) and No 2 (aeroplanes). The establishment of the Battalion was set at fourteen officers and 176 men, but it was some time before full strength was attained. The Battalion had three airships, the *Beta*, *Gamma* and *Delta*, and an assortment of aircraft described as 'an antique Wright which had originally belonged to C.S. Rolls; a somewhat antique and very dangerous Bleriot; The Paulhan, a type no longer sold by Paulhan; a de Havilland; a Henri Farman; four Bristols and a Howard Wright.'

On 10 September 1911, the French 6th and 7th Army Corps, each supported by twenty-five aircraft, began a week of intensive manoeuvres on France's eastern frontier. Originally scheduled to take place in central France, the exercises were switched to the country's frontier with Germany, following a rise in political tension. It was the first time that aircraft had been used as part of a military show of strength.

It was Italy, however, that became the first nation to use an aeroplane in a war situation. It happened on 22 October 1911, when, following Italy's declaration of war on Turkey over a dispute involving the Italian occupation of Cyrenaica and Tripoliana, Captain Carlo Piazza, commanding the Italian Expeditionary Force's air flotilla, made a reconnaissance of Turkish positions between Tripoli and Azizzia in a Bleriot XI.

The Parseval was a very successful German non-rigid airship, and was widely used by the German Army in the early months of the First World War. Author's collection



But it was Britain's Royal Navy that first defined the role of its aviators in time of war. In December 1911 the RN's first flying school was established at Eastchurch, Kent, with six Short biplanes loaned by Frank McLean, a pioneer of the Royal Aero Club. The first four RN pilots had actually begun their flying training in March 1911. Their principal role would be reconnaissance, but they would also be required to search for submarines, to locate minefields, to 'ascend from a floating base', and – of especial importance to the theme of this book – to act as spotters for naval guns.

On 10 March 1912, during operations in North Africa, two Italian Army airships, the P.2 and P.3, carried out a reconnaissance over Turkish positions and their crews dropped several grenades, but without inflicting any damage. On 13 April, during another reconnaissance mission, they remained airborne for 13 hours, their crews spotting for Italian artillery. Several more missions were flown by the two ships before they were withdrawn in June. Some of the later bombing missions were highly successful, the airships' crews breaking up concentrations of Arab tribesmen with well-aimed grenades or accurately-directed shellfire. The P.2 and P.3 were small non-rigid craft, designed by an engineer named Forlanini.

On that same day, in England, the Royal Flying Corps was constituted by Royal Warrant. It became officially established a month later, absorbing the Royal Engineers Air Battalion and the Naval Air Organization. The new Corps included a Military Wing, a Naval Wing, a Central Flying School, a Reserve, and the Royal (formerly Army) Aircraft factory at Farnborough. The Military Wing (Captain F.M. Sykes) was to comprise a Headquarters, seven aeroplane squadrons, one airship and kite squadron, and a Flying Depot, Line of Communications (later renamed Aircraft Park). Nos 1, 2 and 3 Squadrons formed on 13 May 1912, No 4 in September 1912, No 5 in August 1913, No 6 in January 1914 and No 7 in May 1914. The first four squadrons were equipped with a miscellany of the aircraft types then available.

In September 1912, an airship and twenty-four aircraft participated in the British Army manoeuvres held in East Anglia, flying a total of 7855 miles (12,641km). A memorandum issued by the Director of Military Operations at the War Office stated: 'There can no longer be any doubt as to the value of airships and aeroplanes in locating an enemy on land and obtaining information which could otherwise only be obtained by force...Though aircraft will probably have several uses in war, their primary duty is searching for information.'

In fact, some of the 'other uses' had already been demonstrated during the manoeuvres. They included the first practical experiments with airborne wireless telegraphy, when the airships *Gamma* and *Delta* transmitted signals that were received up to 35 miles (56km) away. Much valuable w/t development was carried out by Major Herbert Musgrave, who was made head of the Experimental Branch of the Military Wing of the RFC in 1913, and by Lieutenants D.S. Lewis and B.T. James, both of the Royal Engineers, who by June 1914 were able to communicate with each other in the air. The



The Maurice Farman MF.7 Longhorn was widely used by the Royal Flying Corps, as an observation aircraft and later a trainer. Author's collection

Experimental Branch had a very broad spectrum of tasks to deal with, including ballooning, kiting, w/t, photography, meteorology, bomb-dropping, musketry, gunnery and artillery co-operation.

The Naval Wing (later to become the Royal Naval Air Service) had also been experimenting with wireless telegraphy, and by the outbreak of the First World War, sixteen of its seaplanes had been fitted with lightweight equipment of French design for communication with shore stations. The radio traffic at this stage was one way, from air to ground; it would be some time before the difficulties of reception by aircraft were overcome. In the RFC, pioneering work with w/t was carried out mainly by No 3 Squadron, and it was this unit that carried out trials under operational conditions. However, early airborne equipment was bulky and unreliable, and visual signalling by strips, panels and other devices remained the primary means of communication between observation aircraft and artillery in the first months of the war.

No 3 Squadron, under the energetic and far-seeing Captain H.R.M. Brooke-Popham, also pioneered aerial photography. Because of a lack of funds, its officers had to buy their own cameras and adapt them for aerial work by trial and error. Just before the outbreak of war they succeeded in producing a complete set of photographs covering the defences of the Isle of Wight and the Solent.

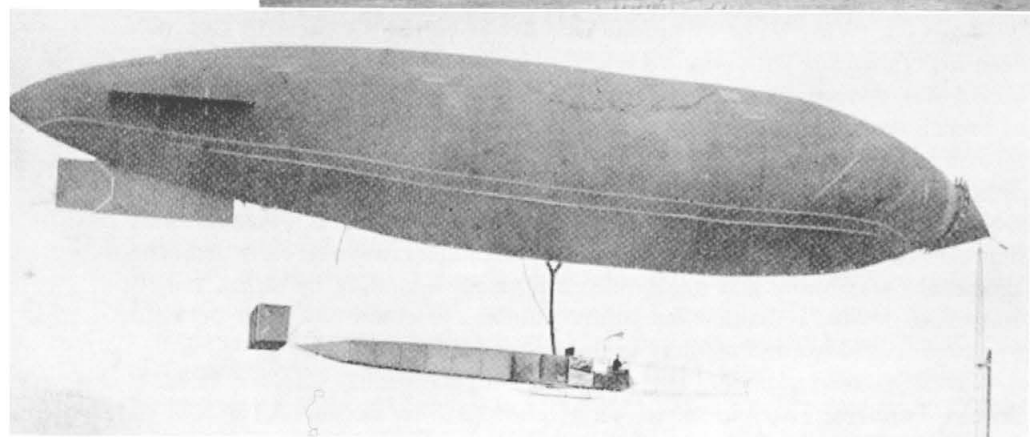
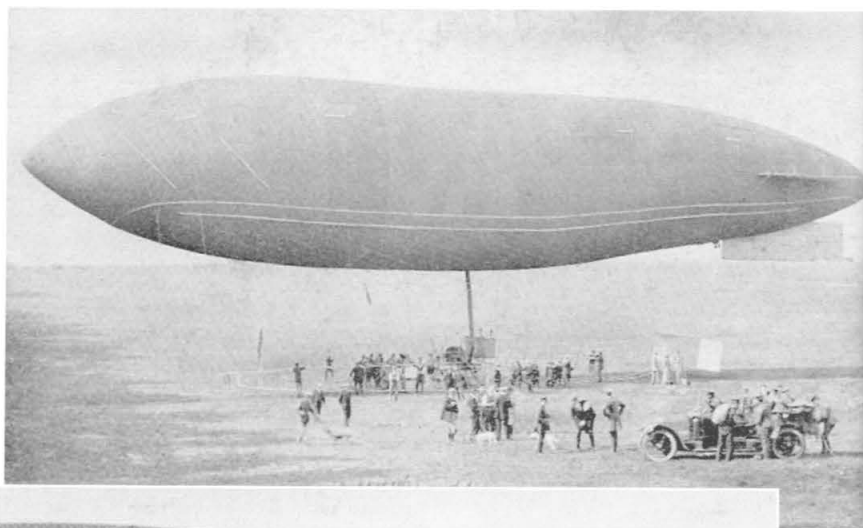


Samuel Cody's Army Aeroplane No 1, seen here on Salisbury Plain, was used for a variety of military trials. Author's collection



The British Army airship Gamma carried out some of the first practical experiments with wireless telegraphy.

Author's collection



The original cameras were of the folding type with bellows and loaded with plates. They were cumbersome to handle in the air, especially in cold weather, and produced poor results. In the autumn of 1914 Major W.G.H. Salmond made a study of the French photographic organization, which was more advanced than any other, and as a result of his report an experimental photographic section was formed with Lieutenants J.T.C. Moore-Brabazon and C.D.M. Campbell, Sergeant F.C.V. Laws and Second Air Mechanic (AM2) W.D. Corse. These four men set about designing a new, effective air camera and completed their task in less than two months. While they were doing so, the first successful photographic reconnaissance was carried out in January 1915, when pictures were taken of some brick stacks south of the La Bassée Canal. These revealed a new German trench system and contributed greatly to the success of an Allied attack that went in on 6 January. From then on, aerial photography was to be a vital factor in operations on all fronts; its importance was such that the need to protect photographic reconnaissance aircraft brought about a requirement for fighter escorts, which in turn gave enormous impetus to the development of air fighting as a whole.

CHAPTER TWO

AIR OBSERVATION

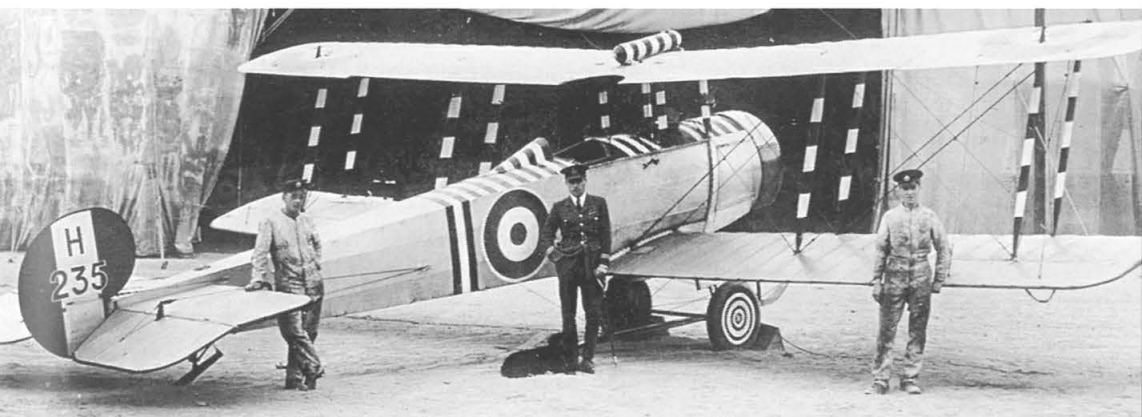
1914-18

On 13 August 1914, nine days after the German Army launched its offensive into Belgium, Nos 2, 3, 4 and 5 Squadrons of the Royal Flying Corps deployed to France with sixty-four aircraft in support of the British Expeditionary Force. The predominant types used by these squadrons were the Avro 504 and the BE.2, and it was the latter that would bear the brunt of the RFC's observation task for the next two years.

In 1909, HM Balloon Factory at Farnborough, which, as its name implies, had been involved in the production of lighter than air craft, began building aeroplanes, and changed its title to the Royal Aircraft Factory in 1912. Its first aircraft product, built in 1911, was the BE.1 (Bleriot Experimental) tractor biplane, which was first flown on 1 January 1912, the pilot was 30-year-old



The long-serving Avro 504, seen here in its later years, was one of the first types to deploy to France with the RFC. Author's collection



Geoffrey de Havilland, who had joined the Balloon Factory in 1910. The rather curious Bleriot Experimental designation was a smokescreen to cover up the fact that the aircraft had been designed by de Havilland and to give the impression that it was a repaired Bleriot-type machine, for at that time the Balloon Factory was authorized to carry out repair work only.

The BE.1, which was built around a Wolseley engine, was quite an innovative design and was followed by the BE.2, which used the same basic airframe and was the first military machine to be built as such in Britain. The BE.2 was one of the first successful attempts at building a fuselage biplane with a tractor engine driving a four-bladed propeller. The wings were of two-spar structure supported by two pairs of struts on each side. The fuselage was rectangular in cross section with curved top decking, the pilot and observer being seated in tandem. The elevator and rudder were of metal construction with fabric covering. The BE.2 was powered by a 70-hp air-cooled Renault engine and, like the BE.1, it was used to carry out a great deal of trials work. Four BE.2s were ordered by Vickers, and the Royal Aircraft Factory was authorized to build another five of them.

Two of the squadrons that deployed to France, Nos 2 and 4, were equipped entirely with BEs. By this time, new models of the basic design had made their appearance, production having given way to the BE.2a with wings of unequal span, the BE.2b with revised decking around the cockpits and ailerons instead of wing-warping controls, and the BE.2c.

The latter, the BE.2c, which appeared in the spring of 1914, differed radically from its predecessors. Its wings had greater stagger and dihedral, but the principal innovation was the addition of ailerons on all four wing sections. These changes further improved the stability of the aircraft, which was enhanced even more by a greatly increased rudder area. The undercarriage was also of a new design and much simpler, dispensing with skids. The wing tips were reshaped, becoming less rounded, and neat cut-outs at the trailing edge of the lower wing roots greatly improved downward visibility. The engine, designated RAF-1a, was a British version of the 70hp Renault, its output increased to 90hp.

The first war flight by a BE was made on 19 August, a Wednesday, when Lieutenant G.W. Mapplebeck on No 4 Squadron took off from Maubeuge to make a reconnaissance of Gembloux, where enemy cavalry had been reported. He sighted a small group of them, and duly reported the fact back at his base.

Time after time, during the following weeks, the BE proved its worth in the air reconnaissance role. It had a longer range than most of the other types used at that time by the RFC, and consequently could penetrate deeper into enemy territory. On 15 September 1914, for the first time, the RFC made operational use of wireless telegraphy during artillery observation, two BE.2s of No 4 Squadron being involved. The pilots were Lieutenants D.S. Lewis and B.T. James, both of whom were later killed. Ten days later, the squadron war diary records a successful w/t exchange between a BE.2 crew and artillery that was endeavouring to engage several enemy batteries located behind a ridge, and

therefore invisible from the ground:

4.02 p.m. A very little short. Fire Fire.

4.04 p.m. Fire again. Fire again.

4.12 p.m. A little short - line OK.

4.15 p.m. Short, over, over and a little left.

4.20 p.m. You were just between two batteries. Search 200 yards each side of your last shot. Range OK.

4.22 p.m. You have them.

4.26 p.m. Hit. Hit. Hit.

4.32 p.m. About 50 yards short and to the right.

4.37 p.m. Your last shot in the middle of three batteries in action. Search all around within 300 yards of your last shot and you have them.

4.42 p.m. I am coming home now.

Wireless telegraphy might have been employed earlier, because No 4 Squadron had arrived in France with a wireless detachment, but the vehicle carrying the receiver ran into a ditch at Villeneuve and the equipment was smashed. Apart from that, the Front, prior to mid-September, was very fluid, making the use of w/t for artillery direction very difficult.

It can be seen from the above w/t transmission that it took forty minutes before the British artillery was able to knock out the German guns, and RFC crews became impatient with the rather laborious correction procedures. It was Lieutenant D.S. Lewis who devised a workable solution by drawing a grid of vertical and horizontal lines on the maps that were used by the gunners and the RFC observation crews, and numbering the resulting squares. This grid reference system could be used to identify a precise square on the ground. As a further refinement, Lewis introduced what became known as the 'clock code', in which shell bursts in relation to the target (the centre of the clock) were expressed as numerals around the clock face, so that, for example, a burst would be described as being at, say, three o'clock from the target and a given number of yards from it.

On 27 September 1914, the No 4 Squadron wireless flight became the

The BE.2 series was the workhorse of the RFC's observation squadrons during the first two years of the First World War. The aircraft seen here are BE.2es, fitted with Le Prieur rocket rails for anti-balloon operations. Author's collection



Headquarters Wireless Section, and on 8 December this was expanded to form No 9 Squadron, with its headquarters at St Omer. Equipped with BE.2as and 2bs, it was the first unit to be formed specifically for artillery direction by wireless. Various detachments of the squadron were sent to co-operate with artillery units, and a decision that existing artillery observation squadrons should have a wireless flight each resulted in No 9 Squadron being dispersed. 'A' Flight went to No 6 Squadron and 'B' Flight to No 2 Squadron on 9 February 1915, while 'C' Flight was split, half going to No 5 Squadron on 1 March and the other half to No 16 Squadron on 22 March 1915, at which point No 9 Squadron disbanded. It re-formed on 1 April 1915 at Brooklands as a wireless training unit, eventually returning to France in December 1915.

In March 1915 the British launched an offensive at Neuve Chapelle, an attack based – for the first time in history – on maps prepared solely from intelligence gathered by aerial photographic reconnaissance, much of it undertaken by BEs. As the assault got under way, the RFC launched the first tactical air bombing offensive, intended to delay the progress of enemy reinforcements. Again, the BEs were in the thick of the fighting, aircraft of Nos 4 and 6 Squadrons attacking the Menin junction and railway stations at Courtrai, Lille, Douai and Don, using 25lb and 11lb bombs. In April, BEs of Nos 2, 7 and 8 Squadrons also attacked railway stations during the battle for Ypres. It was during this battle that Lieutenant W.B. Rhodes-Moorhouse of No 2 Squadron became the first RFC pilot to be awarded the Victoria Cross. Descending to low level to make sure of hitting a target on the line west of Courtrai railway station with his 100lb bomb, he ran into heavy rifle and machine gun fire. Despite being wounded three times he regained his airfield at Merville, but succumbed to his wounds the next day.

The Battle of Neuve Chapelle showed that one of the problems facing an army commander was the loss of contact with his forward troops once action was joined, and it was here that the observation aircraft proved invaluable. Experiments carried out by No 16 Squadron showed that on dry ground, infantry could be seen from a height of 6000 ft (1830m), but they became far more difficult to locate when moving through wet grass or wheat. It was therefore arranged that, in a forthcoming attack on 9 May, the infantry would lay out strips of white cloth to indicate that they had reached certain objectives. The progress of the infantry was also monitored by three wireless-equipped Maurice Farmans, which sent out forty-two transmissions in the course of the day. In the event, no white strips were displayed because the attack petered out in the face of strong resistance. Cooperation between the RFC and the artillery produced better results. One BE.2c crew, Lt C.B. Spence and his observer, Lt the Hon. W.F. Rodney, directed the fire of British and French guns on to a series of German batteries before they were shot down and killed by anti-aircraft fire. On 16 May No 3 Squadron's Morane monoplanes directed artillery fire on to an enemy convoy bringing up reinforcements.

The BE.2c was the first variant to be armed with a machine gun, the

primary reason being that in the early versions the observer had occupied the front cockpit, from which it would have been impossible to use such a weapon. The reconnaissance biplane now had at least some defence against the German scouts that were now becoming organized into efficient fighting units; but technology was about to come into play that would give the Germans almost total air superiority over the Western Front for months to come. The new development was the synchronized machine gun.

'Synchronization' meant, quite simply, relating the rate of fire of a machine gun to the rate of revolution of a propeller so that the bullets missed the advancing and retreating blades, enabling the gun to fire forwards through the propeller disc - which in turn meant that the whole aircraft could be used as an aiming platform. The device was perfected by Anthony Fokker, the Dutch designer who, having been turned down by the British and the French, was building aircraft for Germany. Fokker designed a simple engine-driven system of cams and push-rods which operated the trigger of a Parabellum machine gun once during each revolution of the propeller; in effect, the propeller fired the gun. The mechanism was successfully demonstrated on a Fokker M5K monoplane. This was given the military designation E.I, and so became the first of the Fokker monoplane fighters.

The 'Fokker Scourge,' as it came to be known, began on 1 July 1915, when Lieutenant Kurt Wintgens of *Feldflieger Abteilung* (Flying Section) 6b, flying the Fokker M5K, shot down a French Morane monoplane. There was no doubt about this claim, but since the Morane fell inside French lines it was not upheld by the German High Command. Meanwhile, the production Fokker E.I had begun to reach the front-line German units in June, and the small number of machines available, in the hands of pilots whose names would soon become legendary, began to make their presence felt. Foremost among them were Lieutenants Max Immelman and Oswald Boelcke, both of *Feldflieger Abteilung* 62. The definitive version of the Fokker Monoplane was the E.III, some of which were armed with twin Spandau machine guns, and *Abteilung* 62 rearmed with the new type at the end of 1915. The Fokker Monoplane was the first dedicated fighter aircraft to see operational service, and for months it made Allied reconnaissance flights into German territory virtual suicide missions.

In the early months of the war, the fluid nature of the fighting had precluded the use of observation balloons on a large scale, although the Germans used them to good effect on the Ypres front in October 1914, as is recorded in *A Popular History of the Great War*.

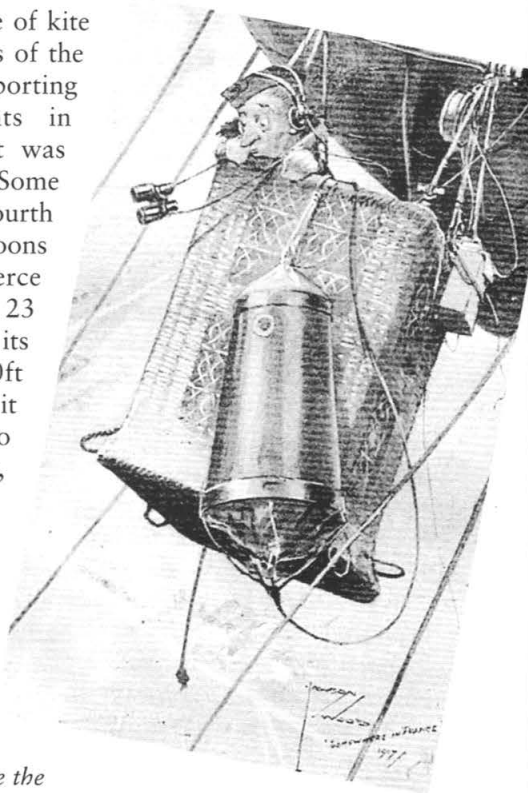
Saturday, October 30, broke over the Ypres front in mist. A low ground fog had prevailed throughout most of the previous ten days' fighting, but the mist on this day was lighter. Indeed, by 10 a.m. it had quite dispersed and for the first time the Germans were able to use their captive observation balloons to direct their artillery. This increased visibility gave the superior German guns a further advantage, and its effect was to be felt throughout the day.

The French and Belgians also used balloons for artillery observation during these early months. The RFC, having laid emphasis on more modern technology such as wireless telegraphy for artillery co-operation, had no balloons to deploy, and in May 1915 the French obligingly loaned one to the British I Corps to assist in artillery spotting during the second Battle of Ypres. A sausage-shaped kite balloon, with stabilizing fins that enabled it to operate even in adverse wind conditions and a basket suspended underneath to accommodate one or more observers, it generated enough interest at HQ BEF for a request for help to be sent to the Admiralty, the RNAS having assumed responsibility for all lighter-than-air craft in 1913. The RNAS deployed a number of kite balloons to the front and these were operated under RFC control in 1915, but the RNAS continued to provide support and equipment until July 1916, when the War Office decided that it was time the RFC had its own balloons, and placed contracts accordingly.

The first Kite Balloon Section to be made available by the Admiralty was assigned to V Corps, and was first in action over Poperinghe on 25 May, 1915. Another balloon section reached France on 26 June and was deployed in the same sector as its predecessor on 1 July. Back in England, the Polo grounds at Roehampton were requisitioned to provide facilities for a Balloon Training Centre.

By the end of June 1916 a long line of kite balloons was in position on both sides of the lines, their observers constantly reporting enemy dispositions and movements in preparation for the great battle that was about to develop on the Somme. Some observers on the front of the British Fourth Army had a bad time when their balloons were struck by lightning in a fierce thunderstorm that raged on Friday, 23 June. One balloon tore loose, carrying its occupants to a height of 13,000ft (3965m) over the German lines before it drifted back again and descended to earth. Both men escaped with their lives, although one was badly frost-bitten.

Two days later, fifteen out of the twenty-three balloons deployed by the Germans were attacked by RFC aircraft. Four were brought down by rockets, and one by a phosphorus



How a British cartoonist pictured the balloon observer. The caption reads 'Somewhere in France - a Balloonatic.' Note the canister containing the observer's parachute. Author's collection

Although it began its operational career as a fighter, the Sopwith One-and-a-half-Strutter was also used in the bombing, reconnaissance and observation roles.

Author's collection



bomb. Three more were destroyed by the Nieuport pilots of No 1 Squadron the next day.

The various British Army Corps committed to the Battle of the Somme, the first phase of which began on 1 July 1916, were supported by twenty-seven RFC squadrons, comprising 421 aircraft, and four kite balloon sections with fourteen balloons. With the exception of No 3 Squadron, which continued to operate its Moranes, all Corps squadrons were now equipped with the BE.2c.

On the German side, the unarmed reconnaissance aircraft with which the German Flying Corps had gone to war in 1914 had long since been replaced by more powerful armed machines. Aircraft of this kind were grouped together under a well-defined category - armed reconnaissance biplanes - and designated Type C. The Aviatik firm, for example, developed its Type C of 1915 from the B.I and B.II, which were built in 1914. The early products of the German Automobil und Aviatik AG of Leipzig were copies of French designs, but in 1914 the company built a small, two-seat reconnaissance biplane designated B.I, which was powered by a 100hp Mercedes engine and which was used in small numbers in the air observation role on the Western front in the early months of the First World War. The type was based on a 1913 design for a racing biplane, the observer being seated in the front cockpit. In 1915, the company's Austrian subsidiary, the Österreichische-Ungarische Flugzeugfabrik Aviatik of Vienna, built a variation of the basic design featuring horn-balanced, overhung ailerons. Designated B.II, the aircraft was fitted with a 120hp Austro-Daimler engine and was armed in the sense that the observer carried a rifle and a pair of 10kg (22lb) bombs, which were dropped by hand.

The B.III was an improved version with a 160hp Austro-Daimler engine

and wings of increased span. The type also featured a single communal cockpit, in which the observer – now armed with a Schwarzlose machine gun on a flexible mounting – sat behind the pilot. The B.II saw a good deal of operational service on the Eastern Front, its excellent endurance making it ideal for long reconnaissance flights over the Russian lines. Its main drawback was that it was unstable, particularly in gusty conditions, which made life uncomfortable for the crew. As a consequence, Aviatik produced a second series of B.II airframes, incorporating the 160hp Austro-Daimler engine and the machine gun installation of the B.III. Bomb load was increased to three 20kg (44lb) missiles. In its new form the B.II (known as the Series 34) was much more stable in flight, was faster than the B.III and could climb to twice the altitude of the original B.II.

The C.I reconnaissance biplane was the first Aviatik aircraft designed from the outset for military use. Developed early in 1915, it was virtually a direct descendent of the B.II, with a similar cockpit arrangement, and although the observer in the front cockpit was armed with a machine gun his field of fire was severely restricted. In the C.Ia the layout was reversed, being similar to that of the B.III. Construction was of wood and fabric, with an aluminium engine bay and tailskid landing gear. Production soon switched to the C.II, with a 200hp Benz Bz.IV engine and significantly revised tail surfaces. The most widely used variant was the C.III, which had reduced-span wings, streamlined nose, and improved exhaust system and a two-gun armament. The Type C Aviatik was mainly used during 1916, where it played an important part on both Western and Eastern Fronts.

One of the best observation aircraft of the First World War, however, was built by AGO (Aerowerke Gustav Otto). This was the C.II of 1915, which was unusual in that it was a pusher-type design, with twin tail-booms. Although the configuration was considered to be outmoded, in this case the formula worked well, and the C.II was a fast, manoeuvrable aircraft with a long range.

An even greater success attended the C Types produced by LVG. During the early months of the First World War the German manufacturer Luft-Verkehrs Gesellschaft produced a small series of unarmed B-type two-seat observation aircraft, and these formed the basis for the C type armed reconnaissance aircraft, introduced in the spring of 1915. The C.I, produced in limited numbers, was followed by the C.II, which was built in substantial numbers and which was used for light bombing as well as visual and photographic reconnaissance. One aircraft made a daring daylight bombing attack on London on 28 November 1916, dropping six 10kg (22lb) bombs on Victoria railway station, injuring ten people (the actual target was the Admiralty). The aircraft suffered engine failure on the way home and was forced to land near Boulogne, the crew were captured. An enlarged version of the C.II appeared in 1916; this was the C.IV, powered by a 220hp Mercedes D.IV engine and fitted with a balanced rudder.

Another very effective observation aircraft was the Rumpler C.I, which

appeared at the beginning of 1915. It was used in large numbers on all fronts. Tough, fast, well-armed and very difficult to shoot down, the Rumpler C.I made an enormous contribution to the German war effort, and was the first German aircraft to fly photographic reconnaissance missions.

A range of very viable observation aircraft was also produced by AEG (Allgemeine Elektrizitäts Gesellschaft), beginning with the B.II. Developed in 1914, the AEG B.II two-seat observation aircraft saw brief operational service during the early months of the First World War before being replaced by more modern types. A derivative was the AEG C.I which was produced in considerable numbers in 1915 and 1916 and served until the end of the war in various capacities. In the autumn of 1915 the AEG C.I was followed by the C.II, a neater design capable of carrying four 22lb (10kg) bombs. The powerplant was a Benz B.III engine.

The AEG C.II was followed in turn by the ungainly C.III, which did not enter production, but in 1916 the company produced its principal type, the C.IV, which remained operational on all fronts until the summer of 1918. The C.IV, which entered service in the early spring of 1916, was primarily a reconnaissance aircraft, but was sometimes used as a bomber escort. The type was armed with a single Spandau gun offset to starboard in front of the pilot's cockpit, and a Parabellum gun mounted on a Schneider ring for use by the observer. The latter's cockpit could also accommodate up to 198lb (89kg) of bombs. Around 658 AEG two-seaters of all types were produced, the majority of which were C.IVs, with 170 in use on the Western Front in June 1917. The C.IV.N was a specially adapted night bomber version, with longer-span wings, a Benz Bz.III engine and a payload of six 110lb (50kg) bombs. Some C.IVs were still in service at the end of the war, and a few were converted for commercial work.

In Austria, Phönix and Ufag produced the Hansa-Brandenburg C.1, designed by a man who was to achieve great fame in the future. His name was Ernst Heinkel. The biplane entered service in 1916 and was widely used for reconnaissance, artillery observation and light bombing until the end of the war. Equally as effective, if not more so, the DFW C.IV and C.V, which also entered service in 1916 and which had excellent handling characteristics. The C.V, in particular, had an impressive performance and was capable of evading even the latest Allied fighters.

On the Eastern Front, some of the most widely used observation aircraft of this period were the Lloyd C Types. Despite the fact that about 500 aircraft were built, the Lloyd C series of two-seat reconnaissance aircraft produced by the Ungarische Lloyd Flugzeug und Motorenfabrik were among the less-known types of the First World War. The series began with the C.I of 1914, an example of which set up a record by reaching an altitude of 20,243ft (6170m) that summer, and progressed to the C.V. The Lloyd C.II of 1915 was followed by the C.III of 1916, these being used extensively on the Italian and Romanian fronts. The service status of the C.IV is unknown, and the C.V, the last in the series, was withdrawn in 1917.

On the French side, the most widely-used observation aircraft in the first year of the war was the Bleriot XI. The type served with at least eight escadrilles of the French Aviation Militaire, and with six squadrons of the Royal Flying Corps in France. When Italy entered the war in 1915 her air arm also had six squadrons equipped with the Bleriot XI. The type also served with the Belgian Aviation Militaire. As well as performing the all-important reconnaissance role, some Bleriot XI were used as nuisance bombers, carrying small hand-dropped bombs or flechettes (metal darts) in racks along the fuselage sides under the cockpit coaming. Rifles or pistols were the only other form of armament carried by the crew. In a notable mission on 14 August, 1914, Lieutenant Cesari and Corporal Prudhommeaux of the Aviation Militaire, flying a Bleriot XI, bombed the German airship sheds at Metz-Frescaty, and during another similar mission on 18 August French aviators claimed to have destroyed three enemy aircraft and an airship on the ground, although this was unconfirmed. It was also in a Bleriot XI that Captain Joubert de la Ferté of No 3 Squadron made the RFC's first reconnaissance sortie of the war, flying from Maueuge, Belgium, on 19 August 1914. The Bleriot XI was produced in five basic variants, 132 aircraft being built in total. The XI Militaire and the XI Artillerie were single-seaters with 50hp Gnome rotary engines, the XI-2 Artillerie and XI-2 Genie were two-seaters with 70hp Gnome engines, while the XI-3 was a three-seater with a 140hp Gnome. A parasol-wing version of the design was designated XI-BG, and was used by the French Aviation Militaire, the RFC and the RNAS. Once their days of front-line service were over, many Bleriot XI found their way into training units.

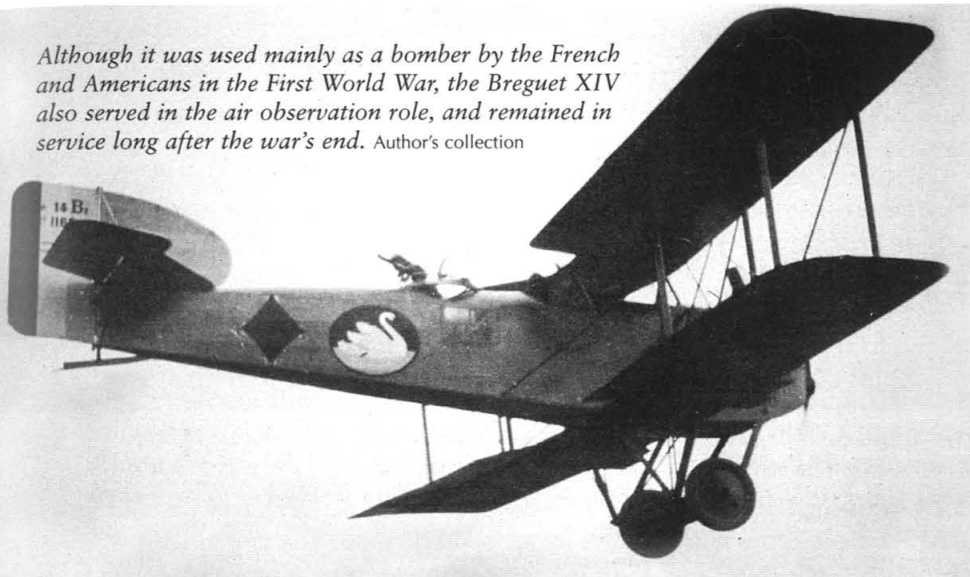
Another widely-used French observation and reconnaissance aircraft was the Caudron G.III, distinctive because of its twin tail-booms and small engine and cockpit nacelle. A two-seater, it had a respectable endurance of about four hours, but was generally too slow and too vulnerable to be retained for long on observation duties. The French machines were withdrawn from first-line service in mid-1916, but some examples purchased by the RFC continued in service well into 1917.

The French observation aircraft that was truly remarkable in terms of longevity, however, was the Voisin biplane, which, in its various developed forms, served throughout the war. The Voisin I (Type L) and Voisin 2 were already in service with four French escadrilles on the outbreak of war and the type was also used by the British and Italians, serving in the bomber as well as reconnaissance roles.

The long and drawn-out Battle of the Somme lasted for three months, during which the observation aircraft of both sides were in almost constant action. During the final phase of the battle in September, on the Fourth Army's front, 159 enemy batteries were spotted, and of these seventy were engaged with the help of air observation. Twenty-nine were silenced, thirteen by direct hits. Observation balloons were the object of frequent attacks, as the official history records:

Two balloons were destroyed by No 60 Squadron, but in this the

Although it was used mainly as a bomber by the French and Americans in the First World War, the Breguet XIV also served in the air observation role, and remained in service long after the war's end. Author's collection



hopes of the RFC exceeded its achievement. The German balloons were not only very heavily defended, they were also hauled down as soon as the attacking aircraft were sighted. Two pilots of No 60 Squadron, Ball [Captain Albert Ball, later to be awarded the VC - author] and Lieutenant A.M. Walters, were among those sent to destroy balloons with Le Prieur rockets, mounted on the outside struts and fired electrically. Finding that their quarries had gone to ground they joined in an air battle and sought to use their rockets against a Roland and an LVG. Ball missed, but got his man with Lewis gun fire, while Walters had the satisfaction of hitting the LVG with one of his rockets and sending it to the earth in flames.

Our own balloons were very active; one of them of No 3 Section was moved in the afternoon to the outskirts of Montauban, where it was soon found that the cable attaching it to earth was in the direct line of fire of one of our heavy batteries. Nevertheless, the observer preferred to accept the risk and continued his observations, until what was feared happened. A shell cut the cable, the balloon soared away and, having ripped it, the observer regained contact with the ground by parachute.

On 15 September 1916, when British tanks went into action at Flers for the first time, they were supported by observation aircraft of Nos 7 and 34 Squadrons, RFC; it was the first example of cooperation between aircraft and armour.

In 1916-17 the Royal Flying Corps was issued with two new types of observation aircraft, the first of which was the Royal Aircraft factory RE.8. Nicknamed 'Harry Tate' after the Cockney comedian, the RE.8 reconnaissance and artillery spotting aircraft resembled a scaled-up BE.2, but it had a much sturdier fuselage and a far better armament, comprising one



The Royal Aircraft factory RE.8 suffered heavy losses and had to have a fighter escort. Author's collection

forward-firing Vickers gun and a Lewis gun in the observer's cockpit, and its RAF 4a engine gave it a top speed of around 102 mph. The first aircraft were delivered in the autumn of 1916 but were grounded after a series of accidents that led to the redesign of the tail unit. The RE.8 was subsequently very widely used, equipping thirty-three RFC squadrons. Like the BE.2, it was far too stable to be agile in combat and suffered serious losses, usually having to operate under heavy escort. Production totalled 4077 aircraft.

It was the RE.8 that bore the brunt of the savage air fighting that took place in April 1917. During the first week of that month, which was to go down in history as 'Bloody April', the RFC lost 75 aircraft of all types in action. The aircraft and tactics of the German *Jagdstaffeln* were superior, and new RFC crews were being sent to the front with as little as seventeen and a half hours' flying experience. By the middle of 'Bloody April' the average life expectancy of an RFC crew in France had dropped to two months. The fierce air battles of early April preceded the Battle of Arras, which began on 9 April. By the end of the month the RFC and RNAS had lost over 150 aircraft and 316 aircrew, the French and Belgians 200 aircraft. The fighting, however, was by no means one-sided: the Germans lost 370 aircraft along the whole Front, 260 of them in the British sectors.

The RE.8 was a far from robust aircraft, and the Germans did not find it difficult to shoot down. Nevertheless, it could give a good account of itself, as was shown on the afternoon of 17 December 1917 when an aircraft of No 3 (Australian) Squadron, ranging for an eight-inch howitzer battery, was attacked by six Albatros D.V scouts. Although hard pressed, the RE.'s pilot, Lt J.L.M. Sandy, shot down one Albatros; its wounded pilot made a forced landing in the Australian lines and was taken prisoner. Then another RE.8 came up and its pilot and observer joined Sandy in engaging the enemy. The two REs fought the five Albatros for nearly ten minutes, until the Germans saw a third RE. approaching and broke off the engagement. The pilot of the second RE., Lt E.J. Jones, flew close to Sandy's aircraft, which was cruising normally, and thought that its pilot and observer, Sgt H.F. Hughes, were

uninjured and that they were continuing their sortie, so he flew back to base to rearm. The next day, No 3 Squadron received a telegram to say that the bodies of Sandy and Hughes had been found in their wrecked aircraft near St Pol. An examination showed that a bullet had passed through the observer and lodged in the base of the pilot's skull. The aircraft had flown itself in wide left-hand circles until it ran out of fuel, and then crashed about fifty miles south-west of the battle area. Sandy was recommended for the immediate posthumous award of the Military Cross and Hughes for the Distinguished Conduct Medal.

The second new observation type to enter RFC service in 1917 was the Armstrong Whitworth FK.8. Designed by Frederick Koolhoven, the FK.8 – known as the 'Big Ack' by its crews – was used by Nos 2, 8, 10, 35 and 82 Squadrons on the Western Front at the beginning of 1918. Its 160 hp Beardmore engine gave it a top speed of around 90 mph and it carried an armament of one synchronized Vickers gun, operated by the pilot, and a Lewis gun in the rear cockpit. Although heavy on the controls, it was well built and robust, could absorb a lot of battle damage and was well liked by its crews. Major K.D.P. Murray, No 10 Squadron's commanding officer, said of it:

The big A-W was slow, but my pilots liked it for the particular job they had to do, and never regarded themselves as 'cold meat'. Owing to the nature of their work, they were rarely in a position to attack, but when attacked, as they were frequently enough, they gave a good enough account of themselves.

Captain John Pattern of No 10 Squadron and his observer, Lt Leycester, definitely gave a good account of themselves in the course of a photographic sortie over the trenches on 29 November 1917. Pattern himself, shortly before his death – he was then in his nineties – told the story to the author.

I was due to go home on leave the following day, and when you had been warned for leave you weren't supposed to fly. But after several days of fog and rain the weather had finally cleared and there were reports of large enemy troop movements south of Passchendaele, so as the Squadron's most experienced pilot I was detailed to go out and get the photographs that were urgently needed. It wasn't that I was a particularly good pilot; it was just that most of the others who had been on the Squadron when I joined it six months earlier were dead. On average, a crew doing our sort of job, flying straight and level over the enemy lines, could expect to last three weeks before being shot down. Some of us, myself included, were lucky; I had been shot down only a week before in a scrap with five Albatros D.IIIs, and my observer and I had walked out of the wreck with only a few scratches. That was one of the good points about the big A-W; it was so strongly built that crews could often walk away from the most horrendous crashes.

On that November morning, Pattern and Leycester – it was their seventh mission together – took off from Abeele and climbed to 5000ft, heading towards Ypres and the front line. Unknown to them, some 30 miles away

another pilot was also taking off from an airfield near Lille. He was Leutnant Erwin Böhme, a *Staffel* commander in the Richthofen *Jagdgeschwader*.

This was a big day in Böhme's life. In a few hours' time he was due to receive Germany's highest award for gallantry - the *Ordre Pour le Mérite*, or 'Blue Max' as it was nicknamed - from the hands of the Kaiser himself. The medal was Böhme's reward for shooting down twenty-four British and French aircraft, but to him its significance was much greater. It would help to remove a burden of guilt he had carried for over a year, since October 1916. Together with his *Staffel* commander, Oswald Boelcke - the most famous German air ace of that time - he had been involved in a dogfight with some British aircraft. Böhme had made a slight error of judgement; his wing-tip had touched Boelcke's and the ace's aircraft had gone down, breaking up as it fell. Boelcke had been killed instantly. Desolate, Böhme had gone to his tent on landing and taken out his revolver, intent on committing suicide, but had been prevented by another young pilot, one Manfred von Richthofen. Now, in November 1917, Böhme commanded Boelcke's old unit, *Jagdstaffel* 2.

Böhme headed for the front line, accompanied by five more Albatros Scouts, intent on claiming one more victim before he received his decoration. The victim should have been John Pattern, whose FK.8 was crossing the front line just north of Westhoek. Pattern takes up the story:

About a quarter of a mile on the enemy side of the lines, I turned south-east and Leycester started to work his camera. The anti-aircraft fire, which had been intense, had not stopped, but I didn't take much notice. I should have known better; it was a sure sign that enemy fighters were in the vicinity. Suddenly, I heard the clatter of Leycester's machine gun above the roar of the engine. I looked round to see what he was shooting at, and nearly had a heart attack. Slanting down from above, getting nicely into position 30 yards behind my tail, was an Albatros. "I immediately heaved the old A-W round in a split-arse turn, tighter I think than I had ever turned before. I felt a flash of panic as I lost sight of the Hun, but Leycester must have been able to see him all right as he kept on firing. My sudden turn had done the trick. The Albatros overshot and suddenly appeared right in front of me. Because of the relative motion of our two aircraft, he seemed to hang motionless, suspended in mid-air. I could see the pilot's face as he looked back at me. I sent a two-second burst of Vickers fire into him. His aircraft seemed to flutter, then slid out of sight below my starboard wing. I was pretty certain that I had hit his petrol tank. Behind me, Leycester was still blazing away. He was using tracer, and it may have been one of his bullets that ignited the petrol pouring from the Hun's ruptured tank. When I caught sight of the Albatros again, it was burning like a torch and side-slipping towards the ground, trailing a streamer of smoke. For an instant I saw the German pilot, looking down over the side of the cockpit. Then the smoke and flames enveloped him. I pushed the A-W's nose down and headed flat out for home, aware that the other Hun scouts were coming down after me.

They would probably have got me, too, if some friendly fighters had not come along just in time and driven them away. To say that I was relieved would be the understatement of the century.

The first week of 1918 found Capt Pattern attached to No 21 Squadron at La Lovie, flying RE.8s in the Passchendaele sector, and his log book records a 'scrap with seven enemy aircraft' on 4 January. He returned to No 10 Squadron on 9 January, the usual activity of trench reconnaissance being broken by an occasional sortie to direct an artillery shoot. The weather was bad, and several sorties were flown in snow and strong winds. No 10 Squadron was now carrying out night bombing attacks in addition to reconnaissance, and it was on one of these that Pattern's luck finally deserted him. The targets were the railway stations at Menin and Courtrai, and Pattern – flying alone – was bracketed by anti-aircraft fire as he crossed the front line on his way home. Severely concussed and knocked senseless, he regained consciousness to find himself flying upside down, perilously close to the ground. He recalled righting the aircraft, and had no recollection of anything else until he found himself within sight of a light beacon which he recognized as Abeele's. He turned in to land, but hit some trees on the approach and crashed. After several weeks in hospital, John Pattern resumed flying duties at the end of May 1918, instructing on D.H.6 primary trainers at No 11 Training Depot Station, Old Sarum, Wiltshire. He never returned to the Front.

The New Year of 1918 dawned to find the Allied armies in a state not far removed from utter exhaustion. The French Army was perhaps in the worst condition, and had been in steady decline ever since its spring offensive of 1917 had petered out amid tragic and bloody loss. After that, it had been in little fit state to mount any major offensive during the remainder of the year except at Verdun, where it had registered some success in the summer; moreover, its High Command had been rocked to the foundations by widespread mutinies among its embittered soldiers. The British had suffered fearful losses in men and material in the bitter and protracted Third Battle of Ypres, while on the southern front the Italians had been utterly crushed at Caporetto. The armistice at Brest-Litovsk, although its terms had yet to be finalized – and until they were, the Germans dare not risk moving men *en masse* from the east – had dealt a bitter blow to any Allied hope of breaking the deadlock of trench warfare and of securing an early victory in 1918. The war diaries of the time record that a strange and ominous silence hung over the snow-shrouded wasteland of Flanders during the early days of 1918. Only in the air was there activity on any scale, and much of that involved routine reconnaissance.

One of the first sorties flown by the Allies was carried out early on New Year's Day by three RE.8 reconnaissance aircraft of No 3 Squadron, Australian Flying Corps, which photographed the entire Australian Corps' front in the Messines sector; the reconnaissances showed signs of heavy transport at the rear of the German lines, and revealed that ammunition dumps were increasing and more gun positions being built, a sure sign that the

enemy was planning large-scale offensive action once the weather improved.

No 3 (Australian) Squadron, which had arrived in Flanders in September 1917, had seen some hard fighting during the previous weeks. Flying from Savy, halfway between St Pol and Arras, it was attached to No 1 (Corps) Wing RFC and ordered to act as support squadron to the RFC squadrons on duty with the two Army Corps in the line: No 5 Squadron RFC, with the Canadian Corps, and No 16 Squadron RFC with XIII Corps. All three squadrons were equipped with the RE.8, which was now the most widely used British two-seater on the Western Front.

A new and stern test was soon to confront the RFC observation crews. During the first weeks of 1918, the German Chief of Staff, 53-year-old General Erich Ludendorff, had been putting the finishing touches to his master plan for a great spring offensive that would drive a wedge between the Allied armies and throw the British into the sea. After much wrangling the armistice terms with the Bolsheviks had at last been thrashed out, making it possible for the transfer of divisions and supporting equipment to the Western Front. Ludendorff, aware that this would be his last chance of securing a major victory before the powerful resources of the United States were thrown into the war in France, knew that his marginal superiority of 200 divisions against the Allies' 175 would not be enough to sustain an offensive in more than one sector of the front. The whole plan depended on a single swift hammer-blow; the problem lay in selecting the spot on which the full weight of the blow was to fall. Some of Ludendorff's staff officers advocated striking against the French, but Ludendorff objected. He pointed out that if the French were defeated the British would almost certainly go on fighting, but if the British were defeated the French would probably give in. Besides, the French were more manoeuvrable than the British, experienced in fluid rather than static warfare; it might prove hard to effect a complete breakthrough in their sectors. There was no doubt in Ludendorff's mind that the blow must be directed against the British.

As February gave way to March, the German divisions that were to take part in the attack swung forward to their jumping-off positions. Seldom, since the early months of the war, had the morale of the German troops been so high. As the time of the attack approached, officers and men were fully briefed on what was expected of them, so that there was no room for rumour or doubt. So thoroughly had all the preparations been made that failure was regarded as an impossibility. If the attack should be held up at any one point, operations were to cease there immediately and the troops switched to another sector. Four army groups were deployed between Arras and La Fère. The most northerly was known as the Mars Group; this was detailed to meet and parry any counter-attack from the direction of Arras, so protecting the flank of the first main attacking army. This was the 17th Army under General Otto von Below; code-named Michael I, it was to be launched against Crosilles and Bullecourt. By mid-March, the strength of the German Flying Corps operating in support of the 17th Army had virtually doubled to include seventeen

reconnaissance *Staffeln*, seven *Schlachtstaffeln* (ground attack squadrons), thirteen *Jagdstaffeln* and three bomber *Staffeln*. These units were deployed on thirty-one airfields in the Lille area. Immediately south of Michael I was the 2nd Army under General von der Marwitz, code-named Michael II; this was directed against Bapaume and Peronne. In support of the 2nd Army were sixteen reconnaissance *Staffeln*, eleven *Schlachtstaffeln*, ten *Jagdstaffeln* and three bomber *Staffeln*, deployed on thirty-three airfields in the area to the east of Cambrai and St Quentin. Finally, in the area around St Quentin itself, was the 18th Army (Michael III) under General Oskar von Hutier, its strength substantially bolstered by the speedy transfer of the reserve divisions of the Crown Prince of Prussia from the Champagne Front north-east of Chalons. The 18th Army was supported by sixteen reconnaissance *Staffeln*, nine *Schlachtstaffeln*, twelve *Jagdstaffeln* and six bomber *Staffeln*. Its task was to drive a wedge between the French and British armies; the latter would then be encircled and destroyed by the two northern German army groups. The number of *Staffeln* engaged in support of a particular army would fluctuate somewhat as the offensive developed, and air units were switched from one sector to another as required.

By the third week of March, the Germans had air superiority on the Somme, with 730 aircraft, including 326 fighters, opposing 579 Royal Flying Corps machines, of which 261 were fighters. Opposite the French sectors the Germans had a further 367 aircraft of all types; the French Aviation Militaire, as it was now known, had some 2000 military aircraft of all types in service at this time, but no accurate figure exists for the numbers deployed in any given sector.

The Germans employed two principal types of photographic reconnaissance aircraft on the Western Front early in 1918: the Rumpler C.VII and the Halberstadt C.III. The Rumpler was the better of the two in most respects and came in two versions, one designed for long-range reconnaissance and carrying wireless telegraphy equipment and the other carrying additional photographic equipment and oxygen apparatus for the two crew, who were also provided with electrically heated flying suits. Service ceiling of the C.VII, which was armed with either one or two machine guns, was nearly 24000ft (7320m), which it could reach in about 50 minutes, and at that altitude it could out-run any Allied fighter type, even if the Allies had possessed one capable of climbing so high. Neither Britain nor France had a reconnaissance aircraft in the Rumpler C.VII's class, and the aircraft ranged more or less at will over the Allied side of the lines in the period before the spring offensive, gathering photographic intelligence that was to prove invaluable to Ludendorff's planners.

At 4.45 am on 21 March 1918, the German artillery opened up with a furious barrage of high explosive and gas shells that pounded the whole length of the British-held front. More than 50 miles of the front, from Monchy to Tergnier, was flooded with poison gas. Long-range artillery was also brought into action, shelling supply dumps and communications centres up to 28 miles

to the rear. The German observation aircraft had done their work well; all known or suspected British gun positions had been meticulously plotted and were now attacked with the aim of weakening the defensive shell curtain and counter-battery fire, and all ground likely to be sheltering reserves was heavily shelled. Then, out of the dense mist, advancing before a creeping barrage of high explosive, fifty-six German divisions hurled themselves forward to the attack.

General Gough's Fifth Army, outnumbered by four to one, was soon reduced to isolated units, pockets of resistance making gallant last stands far behind the forward German echelons, their surviving artillery fighting close-range actions over open sights. For several vital hours neither the men in the forward positions, nor the staff officers at Brigade, Division, Corps and even Army Headquarters had any real idea of what was happening. Communications had been severed by the preliminary artillery onslaught; frantic light signals went unobserved in the fog, which also rendered air reconnaissance impossible on Fifth Army's disintegrating front.

On the left, General Byng, commanding the Third Army, had slightly better intelligence thanks to the crew of a solitary RE.8 of No 59 Squadron, which took off into the murk as the sun was rising and, flying at almost ground level, was able to monitor the German advance for more than an hour before it was hit and put out of action by a shell. About mid-morning, the mist thinned sufficiently to allow more reconnaissance sorties to be flown. There followed a stream of signals from excited RFC crews, indicating a profusion of targets ranging from sunken roads clogged with masses of German infantry to gun batteries being brought into action or moving forward. For the first time, air observation revealed the extent of the disaster that had befallen the two British armies. Every available RFC aircraft that was capable of attacking targets on the ground was thrown into the fray, but operations were hampered throughout 21 March by continual adverse weather, which was worst in Fifth Army's area. All day long, the aircrews flew through shifting veils of fog and mist that would part briefly for a few seconds to reveal enemy forces pushing relentlessly across country from St Quentin. The squadrons co-operating with the Fifth Army attacked wherever and whenever they were able, while the Corps squadrons did their best to provide the British artillery with worthwhile targets.

That they failed to do so led to a great deal of unfair criticism of the squadrons involved. But as historian Hilary St George Saunders pointed out in his book *Per Ardua*:

'The reasons why the Corps squadrons on this and on succeeding days had so little success was very simple. In the storm and stress of battle, the organization for securing a full and effective measure of co-operation between the pilots in the air and the gun crews on the battery sites broke down. When the battle and the war were over this deficiency provided much food for the argument of many and thought of a few...The Royal Flying Corps, it was said, had let slip a wonderful opportunity; well-

directed artillery fire might have so disconcerted the enemy as to have thrown his attack into confusion or even halted it. The critics, both civilian and Service, forgot, or did not choose to remember, one vital factor. Communication from the air to the ground was maintained by wireless and to receive messages it was necessary to erect an aerial. This was what the artillery only too often failed to do. It is not fair to blame them, any more than it is fair to blame the RFC. Batteries had to shift their positions, very often several times a day, and sometimes several times an hour. In such circumstances they could not, or at least did not, erect their wireless masts. Even when, in rare instances, they did so, the battery commander, more often than not, not only did not know the zone calls but was also ignorant of the zone which the battery was supposed to cover. One instance will suffice to make this dreadful situation clear. On the night of 21st-22nd March, T. Leigh-Mallory, the officer commanding No 8 Squadron, sent his wireless officer to do all that he could with such spare equipment as was available to help the wireless operators attached to the batteries with which he was trying to co-operate. The officer made a tour of them and found not one mast erected or in action. In the haste and confusion of the retreat, most of the batteries had abandoned their wireless equipment. 'As soon as the retreat had started,' runs his report, 'all idea of co-operating with aeroplanes seems to have been abandoned.'

In the Third Army's sector, air observation by another 59 Squadron RE.8 (Capt D.H. Oliver and 2nd Lt W.H. Leighton) was able to report by 3.50 pm that a deep bulge had been made in the British lines between Bullecourt and Doignies, placing the left flank of the Fifth Army in jeopardy. To add to the RFC's problems, many of the British forward airfields were now within range of enemy artillery, and some were even in danger of being overrun by German troops. For example, Major Goble's No 5 (Naval) Squadron, which had just moved up to Mons-en-Chausée with its D.H.4s, was very quickly shelled out of it again, forcing a move back to Bois de Roche. By nightfall on 22 March, seventeen squadrons had been compelled to evacuate their aerodromes and move back to safer locations, having first destroyed anything that might be of use to the enemy.

The German Fying Corps moved up quickly to occupy the abandoned airfields. In the words of one account (*Die Deutschen Luftstreitkräfte im Weltkrieg*, G.P Neumann):

After the first front line had been broken through, we advanced rapidly. As the closest possible touch had to be kept with the infantry, it was essential that they should be followed by aeroplanes, and only by such means was it possible to transmit orders and messages, for the despatch riders and runners, owing to the rapidity with which we advanced, were not able to carry out the heavy work imposed upon them. In order to preserve the integrity of the various flying units, their transfer to aerodromes in the devastated area was

effected by groups in convoys of lorries. Aerodromes were first reconnoitred by a photographic machine, and were then divided up among the groups, so that each group was self-contained in its own sector. Special aerodromes were provided for the fighting machines, and on the third day of the attack the enemy's aerodromes which had been closest to the line were used by us. Practically all material found on these aerodromes had been destroyed by fire.

On 23 March, as the weather began to clear a little, Allied observation aircraft brought back more information on the enemy's movements and the scale of his penetration, enabling the General Staff to plan counter-moves. Now, for the first time, the RFC found itself in a position to influence the course of the battle. A magnificent defence by the British infantry divisions in the centre of the Third Army's sector, south-east of Arras, kept the line intact, but the right flank near Bapaume was hard-pressed and fighting a desperate rearguard action as the troops strove to maintain contact with the fragmented and retreating Fifth Army. It was in this sector, on the 23rd, that some of the most intensive air operations took place.

On 24 March, a day of extreme crisis, every available RFC aircraft was ordered to attack the German ground forces, and the war diaries of the German units involved in the offensive bore witness to the growing effectiveness of the air onslaught to which they were being subjected. The diary of the 100th Grenadier Regiment stated that:

Early in the day the First and Second 100th were ordered to assemble near Athies and suffered losses of eight officers and 125 men in a few seconds from air bombs.

The war record of the 8th Grenadier Regiment was even more descriptive.

As we were moving forward after crossing the Somme, there suddenly appeared before us some twenty British aeroplanes which dived to a height of about 100 metres and then, continuing to two or three metres off the ground, attacked us with their machine guns. Several Tommies flew so low that their wheels touched the ground. My company commander, Lt Nocke, had to fling himself flat, but for all that, he was struck on the back by the wheels of one machine, thus being literally run over. Not far from me an aeroplane appeared at about one metre from the ground making straight for me and for the moment I did not know in what direction to throw myself; the pilot appeared determined to run over me.

The next day, 25 March, was also a time of crisis. At 7.30 am, the crew of a No 59 Squadron RE.8 reported very large concentrations of enemy infantry just east of Bapaume and requested heavy artillery fire, but the call remained unanswered, presumably because no one was there to receive it. By this time, part of the area covered by the right flank of the British Fifth Army had been taken over by units of the French Third Army, hastily thrown into the battle, but they too came under very heavy pressure and were relentlessly driven

back. By the afternoon, the whole Allied line was crumbling. It was time for desperate measures. With the Germans sweeping on in the north through Ervillers, in the centre to the outskirts of Thiepval and Montauban down to the Somme at Ham, and in the south towards Hattencourt, Champien and Noyon, Amiens itself - the main British supply and communications base - must surely fall if the enemy drive were not to be checked quickly.

Early that afternoon, after consulting with the Chief of the Air Staff, Sir Hugh Trenchard, the C-in-C of the RFC in France, Major General Salmond, issued a dramatic directive to the commander of IX (GHQ) Brigade, which had not yet been fully committed to the battle but held as a reserve force. "I wish you," Salmond said, "as soon as you can after receipt of this, to send out your Scout squadrons on to the line Grevilliers-Martinpuich-Maricourt. These squadrons will bomb and shoot up everything they can see on the enemy's side of the line. Very low flying is essential, All risks to be taken. Urgent." The Brigade's 9th Wing, comprising Nos 25 and 27 Squadrons (D.H.4), No 62 Squadron (Bristol Fighter), Nos 73 and 80 Squadrons (Camel) and No 79 Squadron (Dolphin) responded magnificently, flying as long as the light lasted, bombing and strafing the enemy columns, flying back to base to rearm and then returning to repeat the process. Hitherto, most of the bombing and strafing had been directed against the Germans' infantry reserves, and this new assault on their communications routes left them severely shaken, as the diarist of the 52nd Reserve Regiment admitted:

Enemy airmen, flying low, delay the march with machine gun fire and bombs...hostile airmen are present in droves. We count more than thirty above us at any one time...Airmen came down to twenty metres in order to release their bombs. One Grenadier regiment has suffered such casualties that it has had to be relieved.

Despite the relentless Allied air effort the German drive continued, and on 28 March a major assault was made on Arras. The approaching enemy columns were seen by RFC observation aircraft, however, and the attack was broken up by further bombing and strafing and some highly effective artillery support. Farther south the exhausted Fifth Army was still under heavy pressure, but observation aircraft reported particularly dense columns of enemy infantry and, in the words of the war diary of No 52 Squadron - flying RE.8s from Abbeville - "our machines had a field day attacking columns in fours. Heavy casualties were inflicted on several enemy battalions."

Although the battle was far from over, it was now clear that the German attack was beginning to lose its impetus. On the southern flank of the bulge created by the enemy advance, fresh divisions of the French Army were coming into the line to stand shoulder to shoulder with the original British forces between Noyon and Roye, and with them, from the Champagne sector, came vital support in the shape of the Aviation Militaire. "All day long," wrote René Fonck, France's leading air ace;

the air was filled with the roar of engines. We flew so low that we almost touched the enemy's bayonets, watching the compact masses of

troops wilt away before our machine gun fire. The chaos was terrible. Panic-stricken horses charged in all directions, trampling soldiers underfoot.

On 1 April 1918, as intense fighting continued, the RFC and RNAS merged to form the Royal Air Force. For the thousands of men and women who now found themselves members of the RAF, the overnight change meant nothing at all. For the time being, it was business as usual. For the fighter squadrons on both sides, that meant renewing their determined efforts to shoot down the opposition's ground attack and reconnaissance aircraft. The German ground attack aircraft, like the RAF's, were operating intensively, as Major Neumann tells:

The trench-strafting machines worked indefatigably from all heights, and on every section of the battle front, directing most of their attention against the enemy's reinforcements. They specialized in attacking the narrow roads and bridges of the Somme, and the results of their work were seen in the evacuated region after the enemy had retreated. In co-operation with the artillery they frequently caused great confusion at such points. Throughout the whole of the offensive the infantry contact machines were working incessantly over the lines.

Some of the RAF's best pilots specialized in attacks on enemy balloons, whose observers had been directing accurate artillery fire. They included Capt Henry Woollett of No 43 Squadron and Lt D.R. MacLaren of No 46. On 2 April Woollett fired sixty rounds into a balloon and sent it down in flames, the two observers jumping clear by parachute; he then attacked a second balloon which also fell in flames, but this time no one got out. By now the Germans were making desperate attempts to haul down a third balloon, but this too burst into flames after Woollett had fired about fifty rounds into it. On 3 April, MacLaren and another 46 Squadron pilot, 2nd Lt J.H. Smith, fired 300 rounds into a balloon before its envelope finally collapsed and it dropped to earth.

Rain, drizzle and thick mist restricted air operations on both sides during the second week of April, but on the 9th, still in poor conditions, the squadrons of I Brigade RAF were airborne, attacking enemy troops and transport between Bois Grenier and La Bassée canal and providing escort for observation aircraft. The enemy's own two-seaters came in for some punishment, five being shot down during the day. The strafing attacks continued on 10 April, but because of the continuing poor weather there were few air combats.

The next day also dawned with low clouds and mist, but by the middle of the afternoon the weather had begun to clear and there was a sharp increase in air activity all along the front, particularly south of La Bassée. The day proved a costly one for the German close support squadrons, which had lost eleven two-seaters. But the RAF observation aircraft had also suffered at the hands of German fighters, and the courage of the observation crews was typified by one battle in which Lts R.G. Hart and L.F. Handford of No 15

Squadron, flying a contact patrol in their RE.8, were attacked by four Pfalz Scouts. The enemy's first firing pass shot away the RE.'s elevator and aileron controls, leaving it virtually helpless. As a Pfalz came in to deliver the death blow Handford fired twenty rounds into it, seeing both sets of wings break away and the fuselage burst into flames, plummeting down to crash near Millencourt. In great pain from a knee wound, Handford engaged another Pfalz, firing at it until he passed out; British troops later reported seeing the aircraft fall in flames behind the enemy lines. One of the surviving Pfalz followed the RE down to 100 ft, but broke away sharply when the RAF aircraft reached the front line. Displaying fine airmanship, Hart managed to crash-land the crippled aircraft, using only throttle and rudder. Pilot and observer were both awarded the Military Cross.

The resumption of trench warfare in the early summer of 1918, after the failure of the German spring offensives, made particularly heavy demands on the observation squadrons of both sides, for there were entirely new trench systems to be registered and artillery emplacements to be pinpointed. The RE.8s of No 3 Squadron, Australian Flying Corps, were particularly effective during this period, although they suffered heavily in the process. Occasionally, however, the Australians were able to get their own back. On 6 June, No 3 Squadron aircraft directed some very accurate counter-battery fire on to enemy artillery positions entrenched in the woods between Sailly Laurette and Etinahem, silencing eight of them. A further nine batteries were knocked out the next day.

On 10 June, during another counter-battery sortie, Lts R.C. Armstrong and F.J. Hart were returning to base when they noticed anti-aircraft fire near Querrieu. Armstrong flew towards the shell bursts to investigate, and sighted a lone Halberstadt at 2000ft, heading east. They cut across its route and, to their astonishment, found that the German crew had no inclination to fight; they made only a feeble attempt to get away, and the Australians were able to shepherd the enemy aircraft without difficulty to Flesselles, where it made a good landing. It was something of a coup, for documents found on the captured Germans, including detailed maps and gave the order of battle of the German forces deployed against the French on the Noyon front.

Observation activities were constantly hampered by poor weather, the problems multiplying when reconnaissances were flown at night. The RAF operations summary for 15 June 1918 records that;

Three machines of 83 Squadron left at 11.5 pm, 11.10 pm and 11.12 pm to carry out a reconnaissance of the area Cambrai-Le Cateau-St Quentin-Peronne. All machines had to be sent together as a clear interval occurred in the weather at 11 pm. The machines returned respectively at 1.5 am, 1.10 am and 2.12 am. Reconnaissances were carried out from heights varying from 800 to 2500ft, but were greatly hindered owing to severe rain storms and low clouds. Several Michelin flares were dropped; a number of lights were seen in woods west of Estrees, and a considerable amount of transport was observed on the road at the SW

edge of Manancourt Wood. Another column of transport was seen on the main road three miles west of Cambrai proceeding in the direction of Bapaume. Observation in the majority of cases was rendered very difficult owing to machines having to alter their altitude very frequently through running into banks of clouds.

A German observer, Lt Freiherr von Pechmann - who was awarded the Ordre pour le Mérite - has provided a graphic account of a sortie into British-held territory in June 1918.

One wonderful June morning, when the sky was cloudless and the atmosphere unusually clear, I set out at 6 am to register a shoot for one light and one heavy field battery, and also a 15-cm gun. Archie bursts in the west were thickly dotted together... We flew over the region of the Somme battle of 1916, a region which had been beaten and obliterated by the hammer-blows of the war god. Here, where once men had lived, there was not a ruin nor a tree to be seen. Only the sad multitudinous piles of rubbish faintly commemorated the sites of former habitations.

On our way to Albert we flew over Bouchavesnes, Maurepas, and Maricourt. An English squadron of eighteen D.H.9s flew over us at a great height, turned south, closely followed by our anti-aircraft fire, and dropped their belated Easter eggs on Cappy-sur-Somme, thereby enveloping that small village and its neighbouring aerodrome in thick clouds of smoke. According to official information and instructions, it was necessary to keep a sharp eye on all aircraft, in order to distinguish between friend and foe, and to avoid being taken by surprise.

The dump at Becourt-Becordel had for a long time been marked on the map as 'Target No 1, awaiting registration,' and it was decided that a shoot could also be carried out on the sugar factory at Ribemont. In that position there was a battery which had bombarded the bridges over the Ancre, and had harried the progress of the morning rations to the troops in the front line. A slight pressure on the key of the wireless apparatus, and the four guns of my battery flashed in a small wood. Forty seconds later four shells burst in the garden to the east of the factory, some 200 yards short. The hostile battery, wishing to conceal its whereabouts, ceased fire, but we were not to be deceived by any such clumsy artifice. Two minutes later the next salvo placed two shells on the factory and two close by. After a bombardment lasting half an hour, the factory went up in flames, and the explosion of ammunition informed us that our friends, the Tommies, had stored all sorts of useful material on the spot.

We were busy registering on our first target when from the west approached five hideous machines, dirty green in colour and ornamented with tricolour circles, but, on seeing the triplanes that were hovering over us, they came to the conclusion that we had better be left in peace... Next we went to our second target, a battery emplaced on the southern

outskirts of Bresle, and proceeded to bombard them. This was paying them back in their own coinage, for we interrupted them in the process of shelling our own battery. The work seemed to last so long that we began to be anxious concerning our supply of petrol, for we still had a third battery marked on our map as being ready to receive our attention.

After two hours, however, we had finished with our second target, and signals were laid out on the ground to notify us that we should now register on Target No 3. This was the most important and also the most difficult target, namely the ammunition dump just to the east of Warloy. Unfortunately, at that moment, a formation of Albatros took the place of the triplanes; consequently the abhorred Sopwiths endeavoured to surprise us by diving out of the sun. Before we could get to work with our machine guns we were twice driven away from the Front far back behind our own lines...then the Albatros scouts took on these gentlemen, and soon one was punished for his audacity, going down in flames. The others, easily frightened, flew back over the lines, and I was able to continue my work.

The first shot fell right into the middle of Warloy, and caused a mechanical transport column which was standing by the roadside to retreat from the village along the road to the east with great rapidity. That pleased me well enough, for we could follow them up with our shells. The next burst, although, indeed, 550 yards short with respect to the ammunition dump, threw up a great cloud of smoke and dust only 120 yards from the routed column...It was not possible for the troops to make any cover afforded by any dug-out, and their retreat was also cut off. They therefore left the lorries to look after themselves, and presumably retired to a place of safety.

I kept my position under the Albatros formation, and, feeling now perfectly secure, amused myself with the binoculars, endeavouring to discover what had actually become of the column. After observing the fifth shell burst, I was very unceremoniously aroused from my interesting occupation by the sudden rattle of a machine gun in my immediate neighbourhood. In a flash the rear gun was swung round towards this new aggressor; I had to save my skin from the attentions of two Sopwiths, which were blazing away like the very deuce less than 100 yards away. The radiator of our engine was riddled with bullets, and the water spurted past our faces as we went down in the tightest possible spiral, with the wires screaming and wailing. It was only thanks to the skilful flying of my pilot that we did not obey the summons to a better world, very much the worse for a few dozen bullet holes, for the two Englishmen, with their four machine guns, could out-manoeuve us every time, and so the odds were greatly against us. Our spiral was so steep that I actually thought that our machine was out of control, and that the pilot was badly wounded.

There was no time, however, for fears of that sort; we had got to escape, that was clear. We were then only 150ft or so over Albert, but the pestering fellows would not leave us, and so we had to work our way still farther east. But the good old engine could not endure being without water any longer, and it was clear that we should have to land among the shell-holes. Then at last our uninvited escort left us to our own devices, and went off to scrape an acquaintance with an observation balloon. Their advances, however, were not well received in that quarter. Finally, when we had reached Montauban, the engine gave out altogether. There was no time to select a landing ground, for our height was only 150ft, and, in any case, each shell-hole bordered on its neighbour. My pilot let the machine glide as far as possible, and then, with only 15 yards of clear ground to land on, put the old L.V.G. down without a wire being strained, a few yards from a deep crater among the ruins of Montauban. Before assistance came and we were able to leave that place, we had the satisfaction of seeing one of our late adversaries come to grief in the distance among the smoke clouds of the sugar factory at Ribemont. Two days later my L.V.G., with a new engine, was flying arrogantly again over the ruins of Montauban.

One combat that took place in the summer months of 1918 exemplified the courage displayed by the observation crews. In August, with the battle for Amiens in full swing, the RAF's reconnaissance aircraft worked as hard as, if not harder than, they had ever done. Losses were high, and many crews were luck to escape with their lives as they operated at low level in search of the enemy. One such crew consisted of Captain Ferdinand West – known to everyone as Freddie – and his observer, Lt John Haslam; on 8 and 9 August they made two reconnaissance flights in an Armstrong Whitworth F.K.8 of No 8 Squadron, Vignacourt, and each time their aircraft was so badly damaged by ground fire that they had to crash land, escaping with no more than shock and a few bruises. The next day they were sent out again on another reconnaissance, keeping an eye open for the enemy fighters that were reported to be very active over the battlefield. Freddie West was not complacent about them, but neither did he fear them unduly; the 'Bick Ack' was a tough nut to crack, and he had developed his own tactics to counter the enemy's, as he explained:

They invariably followed the same tactics. Once they spotted you they went up to about five or six hundred feet above you and then they tried to dive on you, all guns blazing, and shoot you down. Our way to answer was that the observer should open fire immediately he saw the German pilot put his nose down. Often the pilots didn't like being fired at; they broke combat. Occasionally, you had a tougher fellow who wanted to go on fighting. In that case I would try to do a very unpleasant flat turn and try to face the direction the enemy was coming from, because that compelled him to do large turns to the left or to the right and give my observer a chance to fire on him. That's the way we tried to

save ourselves.

On this particular August day, the task of West and Haslam was to locate the enemy's reserves near Amiens, a job that involved flying at 1500ft over enemy territory. West described what happened subsequently.

I was lucky, or unlucky, whichever way you want to look at it, and I was delighted to find at last an area where I saw many German troops, a larger amount of transport, a large amount of guns – and I thought, this is the information that the army needs. And so, having got this information, I made straight for my aerodrome. Unfortunately, German fighters were also of the opinion that I should not bring back this information, and so I was attacked. During one fight I received some explosive bullets in my left leg, which was almost severed, but you know when you are young you are an optimist, and I think the combination of youth, health and optimism got me back. I am also grateful to my observer who did first-class work with his Lewis guns and I'm glad to have this opportunity to pay a tribute to him, because he is still alive. He became a group captain and a parson. He's a reverend, probably due to my bad language in the aeroplane.

What West, with typical modesty, does not say in this account - written in the late 1970s - is that he was attacked by seven enemy aircraft, and that despite being wounded in the foot, and his aircraft damaged, he made another circuit of the area to make sure of the enemy dispositions. On the way back to base he came under continual attack, and his virtually severed left leg fell among the controls. He lifted it clear and twisted his clothing into a tourniquet with one hand, flying the aircraft with the other, and managed to land on a patch of grass close to some Canadian positions. Desperately weak from loss of blood, he insisted on making his report before being taken to hospital, where his leg was amputated. Haslam was also wounded in the ankle, but not seriously. Freddie West was later awarded the Victoria Cross, while John Haslam, who already had the DSC for an action in May, now added the DFC to it. After the war, West, fitted with an artificial leg, resigned himself to a legal career, but with the help of Sir Hugh Trenchard he came back into the RAF and regained his flying category. He served as air attaché in Finland, Estonia and Latvia, and on the outbreak of the 1939-45 war he was a station commander in No 2 Group, RAF Bomber Command, with the rank of group captain. He subsequently served on clandestine duties in Switzerland, where he was involved with the RAF's 'escape line', and eventually retired as an air commodore.

If the job of the observation crews was perilous, the task of the balloon observers along the front was equally so, even though they had the advantage of heavy defences to protect them and parachutes to use if the defences failed. Mostly the parachutes worked, but sometimes they did not, as Lt Smith of No 29 Balloon Section found to his cost on 19 June 1918. With Flight Sergeant Shepherd – who was seriously wounded in the back during the attack – he took to his parachute after their balloon was set on fire by an enemy aircraft.

Shepherd's parachute opened but Smith's did not. He fell for several hundred feet, crashed through the branches of a tree and fell into a bog, from which he emerged with no more than a severe shaking.

By now the American Expeditionary Force had arrived in France. On 24 May 1918, the Air Arm of the US Signal Corps became the United States Army Air Service under the command of Major General William Kenley, himself a pilot. By July 1918 the American First Pursuit Group in France had been expanded to five squadrons, the 27th, 94th, 95th, 147th and 185th, the latter reserved for night fighting. They were initially equipped with Nieuport 28s, but later exchanged these for SPADs, which could meet the Fokker D.VII, the best of the German fighters, on favourable terms. The American Expeditionary Force's First Observation Group, formed in the summer of 1918, used the Salmson 2A reconnaissance biplane, and eleven squadrons were eventually equipped with it; the US day bomber squadrons, like their French counterparts, used the Breguet 14.

At 5.30 am on 27 September 1918, the British armies began their assault on Germany's last line of defence, the Hindenburg Line, and by nightfall it was clear that the attack was meeting with success all along the line; the Canal du Nord had been crossed in several places and the enemy had lost 10,000 prisoners, as well as 200 guns. The part played by the RAF's army co-operation squadrons in this early victory was enormous. Before the battle, an elaborate system of air-ground co-ordination had been devised and rehearsed exhaustively between aircraft and artillery batteries, so that despite the swift movement of the battlefield the aircraft were able to direct the guns with great accuracy.

Enemy aircraft were active all along the front, and the Corps squadrons took some punishment. Early on the 27th, for example, Lt RE. Britton and 2nd Lt B. Hickman of No 13 Squadron, flying an RE.8, were attacked by eight Fokker D.VIIs. Hickman was wounded early in the engagement but went on firing, sending one Fokker down out of control. A minute later Britton was wounded too, and in trying to take evasive action put the RE. into a spin. He recovered just in time and landed in a field behind the German lines. As the Fokker circled overhead, the RAF men slumped in their cockpits and pretended to be dead. The ruse worked and the Fokker flew off without strafing the RE.; as soon as it was safely out of sight Britton took off again and flew back to the squadron's base at Mory, but passed out just as he was about to touch down and crashed. Both occupants were pulled from the wreck alive.

The assault on the main Hindenburg Line defences, between Bellenglise and Vendhuile, was launched on Sunday 29 September. Captured German documents had provided the British commanders with details of every German defensive position, as well as supply dumps and communications centres, and these were subjected to heavy shelling and also bombing attacks as long as the weather permitted. Progress was swift – too swift in some areas, such as the sector in which the US 27th Division pushed on too far and found itself cut

off in smoke and fog that made it impossible for pilots on contact patrol to see flares and other signals. As a result, the Americans suffered heavily. Bad weather on the last day of the month also made it impossible for the RAF to give full support to the ground forces, and enemy resistance was stubborn. Nevertheless, by nightfall on the 30th the British forces had taken the St Quentin Canal, almost all the Hindenburg Line defences had been overwhelmed, and German resistance was beginning to crumble. Soon, in the autumn rain and mist, on roads clogged by the Flanders mud that had been the misery of millions of men for four years, the battered but still undefeated German armies were trudging back the way they had come in 1914.

At eleven o'clock in the morning of 11 November, 1918, the armistice came into effect. Forty-five minutes later, an RE. 8 observation aircraft touched down at Auchy. Its crew, Captains H.L. Tracy and S.F. Davison, reported that no enemy aircraft had been seen; British troops were in Mons, where the British Expeditionary Force's long retreat had started more than four years earlier, and enemy AA fire was nil. On the Western Front, at last, all was quiet.

OPERATIONS ON OTHER FRONTS

In the Mediterranean, the principal area of operations was the Dardanelles, and in this theatre much of the artillery spotting was done by aircraft of the Royal Naval Air Service, operating from seaplane carriers. Turkey had come out on the side of the Central Powers (Germany and Austria) and her troops were pressing the Russians hard in the Caucasus. In an attempt to relieve the pressure, an Anglo-French combined operation was mounted, its aim to force a passage of the Dardanelles - the winding, treacherous 40-mile (64km) stretch of water leading from the Aegean to the Sea of Marmara - and land an expeditionary force before Constantinople (Istanbul), the belief being that such a show of strength would quickly force Turkey out of the war. But the Turks were ready to confront such a plan. With German help they had mined the waters and installed powerful batteries to cover the minefields, so that any attempt to sweep them would be met by devastating gunfire. Before the mines could be swept the forts therefore had to be neutralized, and this could only be done by naval gunfire. A powerful Anglo-French naval force was assembled, comprising fourteen pre-dreadnought battleships (four of them French) the battlecruiser *Inflexible* and the new dreadnought *Queen Elizabeth*.

The bombardment of the forts at the entrance to the Dardanelles began on 19 February 1915, with two Sopwith seaplanes from the seaplane carrier *Ark Royal* acting as spotters. The forts were shattered, enabling trawlers to sweep the first 4 miles of the straits. Seaplanes from the *Ark Royal* continued to operate in the spotter/reconnaissance role throughout March, as did No 3 Squadron RNAS, established at Tenedos on the peninsula with a miscellany of eighteen aircraft. A kite-balloon ship, the *Manica*, was also brought into use, beginning operations on 19 March. Her balloons proved extremely useful and



The Short Type 827 seaplane was widely used by the RNAS in the naval gunnery spotting role. Real Photographs

played an important part throughout the campaign, as did those of a second ship, the *Hector*.

However, it soon became clear that without military support ashore, further attempts to force a passage of the Dardanelles would meet with failure, and consequently April 1915 saw the beginning of the disastrous Gallipoli campaign, with Allied forces landing on the peninsula in what was then the largest opposed amphibious invasion in history. Allied warships continued to support the ground forces until they were evacuated in January 1916, having suffered appalling attrition through enemy action and disease.

Apart from the Dardanelles campaign, RNAS observation aircraft also served in the humidity of Africa. In July 1915, three Short Type 827 seaplanes arrived in Mombasa aboard the armed liner *Laconia* to assist the British monitors *Severn* and *Mersey* in their efforts to force the German cruiser *Königsberg* out of her refuge 7 miles up the steaming Rufiji River in Tanganyika. One of the seaplanes, flown by Flight Lieutenant J.T. Cull, spotted for the monitors' guns during the final action. The aircraft was hit and crashed in the river, but Cull and his observer were picked up safely by the *Mersey*.

The two surviving seaplanes, together with a third replacement aircraft, were sent to Mesopotamia (Iraq) in August and two were used as bombers against the Turkish advance on Kut-al-Amara the following December. Four more Shorts were sent out to Zanzibar on the *Laconia* in March 1916 and, operating alternately from Chukwani Bay and the *Laconia*, the cruiser *Himalaya* and the balloon ship *Manica*, they spotted for the guns of the *Severn* at Lindi and reconnoitred enemy positions in preparation for the British landings. A few weeks later they were handed over to the Belgians, who took them overland to Lake Tongwe and used them to bomb the German lake cruiser *Graf von Goetzen* in Kigoma harbour. Other Short seaplanes served in the Mediterranean, at Otranto and with the seaplane carrier *Ben-my-Chree*, which - as part of an RNAS force under Commander C.R. Samson - operated

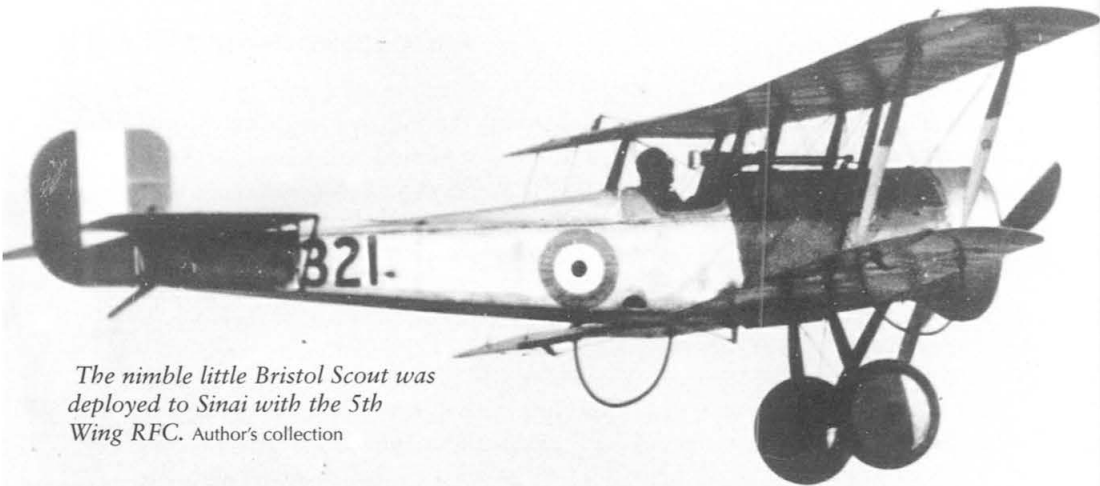
in the Eastern Mediterranean, the Red Sea and the Indian Ocean during the latter part of 1916 and early 1917, until she was sunk off Castellorizo in January of that year. She was replaced by the seaplane tender *Raven II*, whose aircraft patrolled the Laccadive Islands in an unsuccessful search for the German commerce raider *Wolf* during the spring of 1917.

The spring of 1918 saw the Royal Flying Corps engaged in three separate theatres in the Middle East: Macedonia, Mesopotamia and Palestine. In Mesopotamia, the Royal Flying Corps' effort had been sustained entirely by No 30 Squadron, operating Martinsyde S.1 scouts and assisted by some RNAS aircraft, until August 1917, when it was joined by No 63 Squadron with RE.8 army co-operation aircraft. This unit, however, did not become fully operational until November because of technical difficulties with its aircraft and continuing sickness among its personnel. British operations against the Turks in Mesopotamia were now concentrating on three fronts – the Tigris, Euphrates and Diyala – and a major offensive was planned to take place on the Euphrates front early in 1918. Shortly before it began, a third RFC squadron, No 72 – equipped with Martinsyde G.102 bomber/reconnaissance aircraft – also reached Mesopotamia.

Although the RAF aircraft made constant and telling attacks on the enemy forces in Mesopotamia throughout the summer of 1917, their most important task was air reconnaissance. Constant air patrols made it impossible for the Turkish forces to move unobserved, while extensive photographic coverage enabled the British to produce accurate maps of their lines of advance.

Meanwhile, Macedonia – where an Anglo-French expeditionary force had landed at Salonika to form another front against the Turks, assisted by the Serbian army – had been the scene of some fierce air fighting. The two RFC squadrons in this area, Nos 17 and 47, were equipped with a mixture of BE.2cs and BE.12s, and both suffered heavy losses in 1917 at the hands of a German unit designated *Flieger Abteilung* 30. The latter was commanded by a near-legendary pilot named Rudolf von Eschwege, whom the Bulgarians nicknamed *Bjelomorsko Orel* – the Eagle of the Aegean Sea. By the time of his death in November 1917, von Eschwege had destroyed twenty Allied aircraft. It was only when the first few SE.5s arrived in Macedonia towards the end of 1917 that the British army co-operation aircraft were able to go about their business in relative safety.

Important though the campaigns in Mesopotamia and Macedonia undoubtedly were, the decisive front against the Turks lay in Sinai, between the Suez Canal and Palestine. Here, land operations were supported by the 5th Wing of the RFC, whose strength in the summer of 1917 was twenty BE.2cs and 2es, two Bristol Scouts and nine Martinsydes divided between Nos 14 and 17 Squadrons, with five more BE.2cs on attachment to Colonel T.E. Lawrence's forces in Arabia. Following the appointment of General Sir Edmund Allenby as the British commander on the Sinai front in June 1917, two more squadrons were added to strength: No 111 with Bristol Fighters and Vickers Bullets (and later SE.5s) and No 113 with RE.8s.



The nimble little Bristol Scout was deployed to Sinai with the 5th Wing RFC. Author's collection

With the aid of the Bristol Fighters, the RFC managed to establish air superiority in readiness for Allenby's coming offensive in southern Palestine, most of which had been photographed during the preceding weeks by the BEs. Allenby wanted the Turks to believe that the main attack would be directed against Gaza, whereas in fact Beersheba was his objective, and his preparations were completed by 30 October 1917. On that date, a German observation aircraft was shot down by a Bristol Fighter of No 111 Squadron and its crew captured. They had in their possession photographs showing the British positions and the line of attack. Had they got back to base, this information would have enabled the Turks to meet the assault; as it was, they were taken completely by surprise and Beersheba fell with 2000 prisoners. The Turks retreated in confusion, harassed by artillery fire and air attack, and Jerusalem was captured on 9 November.

In 1918, the British forces, depleted by the transfer of some divisions to the Western Front to help meet the threat of the German spring offensive, pushed on to occupy the territory between Jerusalem and the River Jordan, and from

One of the decisive elements in the Sinai Campaign was the two-seat Bristol fighter. Author's collection



there towards Amman in conjunction with the Arab advance in the desert. Throughout these operations, the Palestine Brigade of the RFC (later RAF) remained at full strength. The order of Battle now comprised Nos 14, 111, 113, 142, 145 and No 1 (Australian) Squadrons, which by now were receiving a constant flow of reinforcements from Britain via Egypt.

Allenby bided his time, waiting until the fierce heat of the summer months had dispersed before launching his last and most masterly offensive on 19 September 1918. It was preceded by bombing attacks on several important enemy communications centres, telephone exchanges being primary targets. For several hours after the offensive began, Turkish and German commanders were in complete ignorance of what was happening. They were unable to rely on air reconnaissance because their main airfield at Jenin was constantly patrolled by flights of SE.5As, which dropped small bombs and pounced on anything that tried to take off. During the early stages of the attack, RE.8s of No 113 Squadron laid a smokescreen – the first time that aircraft had been used for this purpose.

Every possible line of Turkish retreat had been carefully studied by air reconnaissance before the start of the offensive, and by the early morning of 20 September General Allenby knew that the Turkish Eighth Army on the right flank, near the sea, was pulling back in a state of confusion. He therefore threw the weight of his assault against it, and the retreat became a rout by the evening. This disaster made the position of the Turkish Seventh Army completely untenable, all its lines of retreat having been cut by British armoured cars and cavalry.

Soon, the Seventh Army had joined the remnants of the Eighth in a panic-stricken rout, columns of men and material jamming the road that ran south of Nablus to cross the Jordan at Jisr ed Damiye. For a considerable distance, this road ran through a deep defile, the Wadi el Far'a, and shortly after dawn on 21 September, two patrolling Bristol Fighters reported that the wadi was choked by a dense mass of Turkish troops and transport.

It was now that the RAF squadrons unleashed their full fury on the luckless Turks. For an hour, from 1100 until noon, the Bristol Fighters of No 1 (Australian) Squadron, the DH.9s of No 144 and the SE.5As of Nos 111 and 145 roved back and forth above the wadi, carrying out 88 bombing and 84 machine gun attacks in which they dropped nine and a quarter tons of bombs and expended 56,000 rounds of ammunition. The slaughter was frightful. When the last aircraft flew away, the wadi was clogged with corpses, lying in heaps amid dead and dying horses and shattered transport. Some days later, when British forces inspected the carnage, they counted 100 guns, fifty-five lorries, four staff cars, 912 wagons and twenty water carts. The dead were numbered in thousands and no one ever bothered to establish an exact total. The utter destruction of the Turkish armies in Sinai had been accomplished in 60 minutes for the loss of two aircraft, destroyed by ground fire.

East of the Jordan, the Turkish Fourth Army was under severe pressure from irregular Arab forces under Prince Faisal, aided by Colonel Lawrence

and supported now – in addition to a pair of RE.8s of 'X' Flight, No 14 Squadron – by two Bristol Fighters and a DH.9. A German air squadron was operating in the area and the Arabs had suffered several bombing and strafing attacks, but the tables were soon turned when the Bristol Fighters shot down two German two-seaters and a Pfalz in a single air engagement. The air support had a profound effect on the Arabs' morale and they were soon cooperating fully with the British forces that were moving against the Fourth Army, which was now being attacked from the air by the squadrons which had blocked the Wadi el Far'a. On 28 September, the Turkish Fourth Army surrendered and the forces of Allenby and Faisal marched together on Damascus on 1 October. At the end of October, Turkey sought an armistice, bringing the long struggle in the Middle East to an end.

CHAPTER THREE

THE DEVELOPMENT OF AOP BETWEEN THE WARS

GREAT BRITAIN

The four years of the First World War marked history's greatest technological leap forward in terms of military hardware. Yet, almost before the guns had ceased firing, both the Admiralty and the War Office joined forces in a determined bid to abolish the Royal Air Force – the service in which technical advance was most apparent – as a separate organization. Both regarded the RAF as little more than a wartime expedient, although in fairness it should be said that the Army treated its own child, the Royal Tank Corps, in exactly the same way, with results that were to be all too apparent twenty years later.

The Royal Air Force ended the 1914-18 War a formidable fighting machine, with ninety-five squadrons on the Continent, fifty-five operational and 199 training squadrons in the United Kingdom and thirty-four more in the Middle East and India. By the beginning of April 1919, however, the number of squadrons on the Continent had dwindled to forty-four, and at the end of October there was only one. The wholesale decimation of the RAF began in earnest in January 1920, and by the beginning of 1921 its strength was at a very low ebb. Apart from training establishments, there were only four army co-operation squadrons and one fighter squadron in the United Kingdom, five squadrons in Egypt, four in Iraq, four in India and one in the Far East, not counting the handful of floatplane or flying-boat squadrons for maritime reconnaissance and coastal patrol.

The battle waged by the Air Staff and its chief, Air Chief Marshal Sir Hugh Trenchard, to save the RAF from complete extinction as a separate service was one of epic proportions. The turning point came on 12 March 1921, when a conference was held in Cairo under the chairmanship of Winston Churchill, who was then Secretary of State for the Colonies, with Trenchard at his right hand. The conference was attended by the civil and military administrators of the British protectorates and mandates throughout the Middle East, and to them Churchill and Trenchard proposed a novel scheme: that the policing of troubled areas, particularly in Mesopotamia and the North-West Frontier of India, be carried out by designated squadrons of the Royal Air Force, reducing ground forces to the necessary minimum.

The scheme was adopted without question and it was decided to implement it initially in Mesopotamia (renamed Iraq in September 1921) and Jordan. The RAF assumed responsibility for internal and external security in these two countries in 1922, the aircraft in primary use being the de Havilland DH.9A



Bristol Fighters over mountainous terrain in northern Iraq, a major trouble spot in the inter-war years. Author's collection

The original Airco DH.9 (seen here) was seriously underpowered, but the re-engined DH.9A proved to be a splendid aircraft.
Author's collection



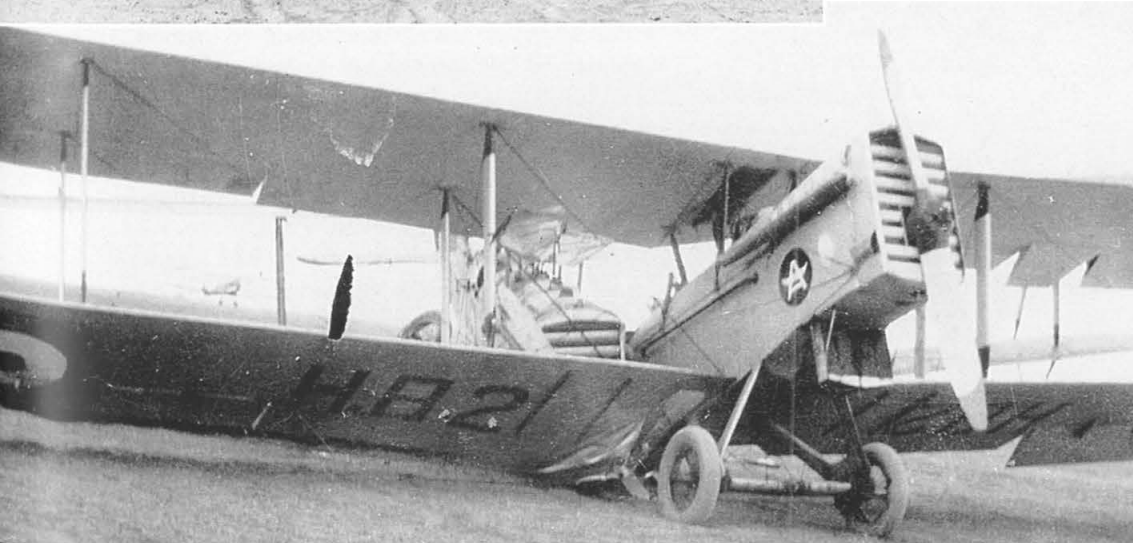
(nicknamed the 'Ninak') and the Bristol F2B Fighter. A similar situation existed in India, where the RAF saw much action against dissident tribes on the frontier with Afghanistan.

These overseas operations made army co-operation one of the RAF's key roles, and by the end of the 1920s six army co-operation squadrons were operational in the United Kingdom. The first of these was No 2 Squadron, which, having disbanded in February 1920, immediately re-formed at Oranmore in Ulster to support the army in Ireland, which was then heavily engaged against IRA terrorists. Equipped with Bristol F2Bs, it moved its HQ to Farnborough in September 1922, but left a detachment in Ulster until February 1922. In April 1927 the squadron left for Shanghai, where disturbances in China were threatening to upset the international settlement governing the use of the port. It arrived back in the UK in September 1927, and two years later it exchanged its weary Bristols for a new army co-operation type, the Armstrong Whitworth Atlas. One of the most versatile army co-operation aircraft of the 1920s, the AW Atlas biplane first flew in May 1925 and equipped six RAF squadrons from October 1927.

Also armed with Bristol F2Bs in the early 1920s was No 4 Squadron, which like No 2 co-operated with the army in Ireland until September 1922, when it deployed to Turkey until September 1923. It, too, received Atlases in October 1929. Two more army co-operation squadrons, Nos 13 and 16, re-formed on 1 April 1924, the former at Kenley and the latter at Old Sarum. Both were



*Operations from rough airstrips in the Middle East and India resulted in frequent accidents, as these wrecked DH.9As testify.
Bill Thackeray*



The Armstrong Whitworth Atlas was extremely versatile and robust, equipping six RAF squadrons. Author's collection



An AW Atlas, hook extended, about to retrieve a message attached to a cord strung between two poles. Flight



One AW Atlas was experimentally fitted with floats to assess its potential as a naval observation aircraft. IWM

equipped with Bristol F2Bs and, later, Atlases. No 13 Squadron played a considerable part in developing close co-operation techniques between air and ground forces during the inter-war years, while No 16 Squadron became the RAF's specialist artillery-spotting unit. The fifth army co-operation squadron, No 26, re-formed at Catterick on 11 October 1927, initially with a single flight of Atlas aircraft, while the sixth squadron, although designated as an army co-operation unit, was in fact nothing of the sort. This was No 24 Squadron, which had been re-formed at Kenley on 1 April 1920 as a communications and training squadron. Initially equipped with F2Bs, it subsequently operated a wide variety of aircraft.

In October 1928, a long-awaited increase in the RAF's strength in India at last became reality with the arrival of two



Policing the empire: a bombing raid in progress against a dissident village on the North-West Frontier. via Bill Thackeray

more squadrons, Nos 11 and 39, the former equipped with Westland Wapitis and the latter with DH.9As. The Westland Wapiti two-seat general purpose biplane was designed to replace the DH.9A, the prototype flying in March 1927. As first flown, the Wapiti had DH.9A wings and tail assembly, but the Wapiti I, twenty-five examples of which were ordered for service trials with No 84 Squadron in Iraq, had an enlarged tailplane and a 420hp Bristol Jupiter VI engine. Ten Wapiti IIs with uprated Jupiter VI engines were followed by the Wapiti IIA with the 550hp Jupiter VIII, this variant appearing in 1931. In all, Westland built 565 Wapitis, including eight Mk Is and 20 Mk IIs for the RAAF, and four Mk IIIs for the SAAF, which also used twenty-seven licence-built aircraft. Some ex-RAF Wapitis were used by the RCAF.

No 39 Squadron did not retain its 'Ninaks' for long; by February 1929, it too had re-equipped with Wapitis. Both squadrons were involved in punitive

Westland Wapiti IIA of No 30 Squadron, Hinaiidi, 1928. via Bill Thackeray





Westland Wapitis of No 11 Squadron over the Indus. via Bill Thackeray

air operations against dissident tribes that went on at regular intervals throughout the 1930s, during which time the RAF strength in India remained at eight squadrons.

In 1934, all but one of the RAF's army co-operation squadrons at home were equipped with the Hawker Audax, a variant of the Hawker Hart biplane light bomber, which was widely used during the 1930s, while overseas

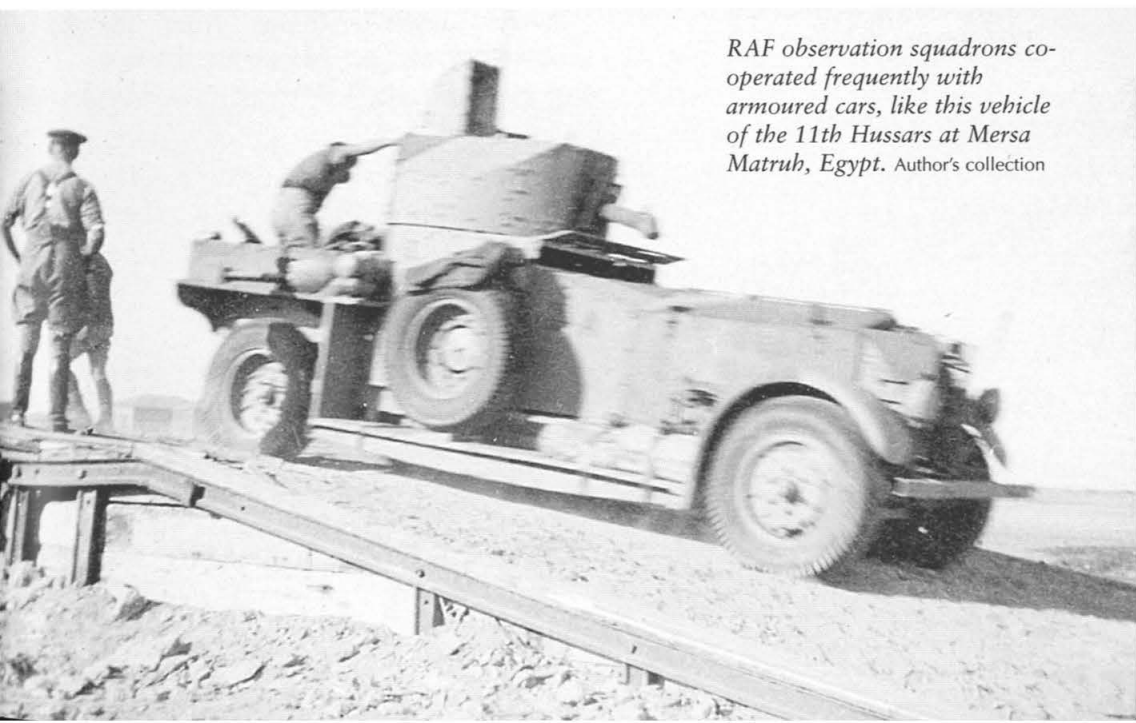
Westland Wapitis of No 11 Squadron deployed to a forward airstrip on the North-West Frontier. via Bill Thackeray





Local dignitaries admiring Wapitis of No 39 Squadron. via Bill Thackeray

squadrons continued to use the Wapiti. In February 1937, the home-based army co-operation squadrons began to equip with the Hawker Hector, yet another Hart derivative, and seven squadrons were using the type by the middle of 1938. Overseas, army co-operation squadrons began to replace their Wapitis with the Hawker Hardy, which was basically a Hector fitted out for tropical service. At home and abroad, the Hector and Hardy remained the standard army co-operation types until the advent of the Westland Lysander, the first examples of which were delivered to No 16 Squadron at Old Sarum in July 1938.



RAF observation squadrons co-operated frequently with armoured cars, like this vehicle of the 11th Hussars at Mersa Matruh, Egypt. Author's collection

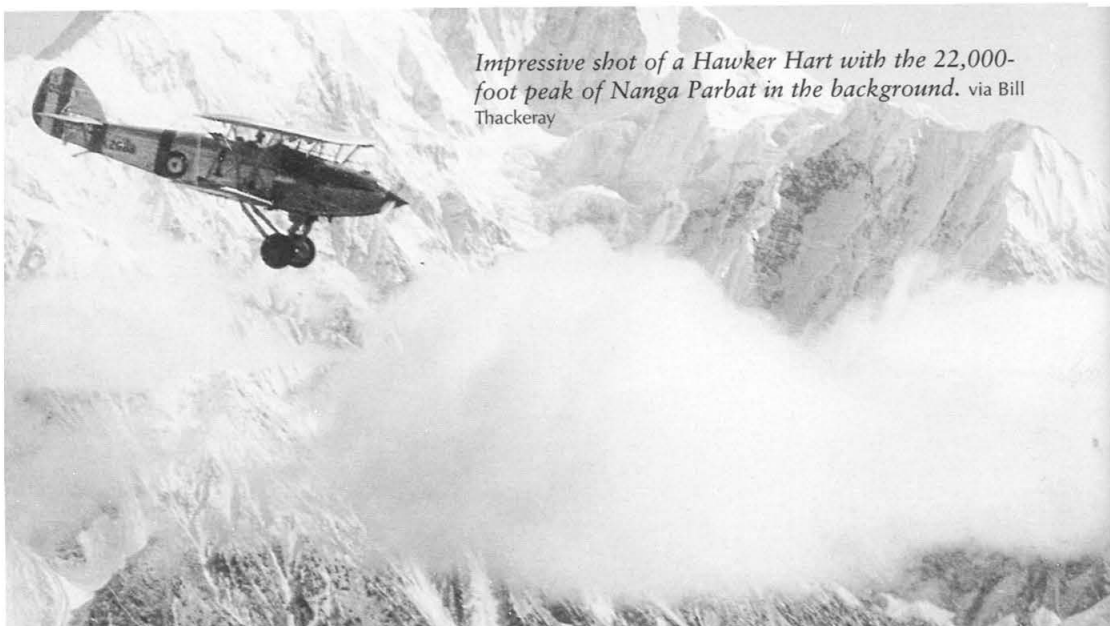


The Hawker Hart light bomber, seen here, gave rise to the Audax, Hardy and Hector army co-operation variants. Author's collection



Hawker Hart over Alexandria harbour, 1935. Author's collection

The Lysander had its origins in Air Ministry Specification A.39/34, calling for a two-seat army co-operation aircraft to replace the Hawker Hector. One of the companies submitting a design proposal was Westland Aircraft Ltd, which had been building the Hector under licence from Hawker. Westland's submission to A.39/34 was the P.8. It was primarily the work of Arthur Davenport, under the technical direction of W.E.W.(Teddy) Petter, grandson of the company's founder. In creating the P.8, Petter sought opinions from the squadrons that would operate the new



Impressive shot of a Hawker Hart with the 22,000-foot peak of Nanga Parbat in the background. via Bill Thackeray

aircraft. The consensus of opinion favoured an aircraft with good visibility from the cockpit, the special performance necessary to take-off and land from extremely small areas, and excellent handling at very slow flying speeds.

The resulting design was innovative. Its wooden, fabric-covered wings had full-span automatic leading-edge slats that operated from any position between closed and full open, allowing maximum use of this lift device, while the flaps could be lowered to any position between fully up and fully down depending on speed. The Lysander was therefore able to land and take off at extremely low speeds from very small fields, operating comfortably from pastures, fields, and even forest clearings.

To maximise cockpit visibility, Davenport raised the wing to the top of the canopy and braced it with two pairs of sturdy struts. To boost the low-speed characteristics of the aerofoil, the wing was thickest at about mid-span but shrank by nearly half at the wing roots. Viewed head-on, the wing bent like the wing of a seagull. The inboard leading edges tapered toward the tail to allow the pilot to see through the top of the canopy during very steep turns, and the outboard trailing edges tapered forward to give the aircraft a good roll rate at slow speeds. The distinctive landing gear had a landing light and machine gun mounted inside the enormous fairings, while stub wings could be attached to hold light bombs, supply containers, or other stores.

In September 1936, the Air Ministry selected the Westland design and ordered 169 aircraft. In keeping with the policy of the time, which was to name army co-operation aircraft after classical warriors, the new type was given the name Lysander after the Spartan admiral who defeated the Athenian fleet during the Peloponnesian War in 405 B.C.

The RAF's army co-operation structure between the wars was centred on the School of Army Co-operation, which was formed at Old Sarum in Wiltshire in 1920 and which conducted courses for Army officers and the pilot and observers of the RAF army co-operation squadrons, concentrating on

Sort that out! An early model Westland Lysander comes to grief while taxiing at RAF Acklington, Northumberland, in 1938. Jim Rosser





The Cierva C.30 autogiro was evaluated for the air observation role by both Britain and France. This is a French Navy example. ECP Armées

artillery spotting and tactical reconnaissance. From April 1924 a number of army co-operation squadrons were based at Old Sarum, including Nos 13, 16 and 59, all of which were attached to the school.

In addition to the types mentioned above, several other aircraft were tested at Old Sarum to assess their suitability for the army co-operation task. One of the most interesting was the Cierva C.30A autogiro, which was produced under licence in the United Kingdom by Avro. Ten were delivered to Old Sarum from December 1934 and were evaluated, although they never served in the army co-operation role. Instead, as the Rota Mk 1, they were later used for radar calibration duties.

FRANCE

In the 1920s, the majority of France's air observation squadrons were equipped with the Potez 25, one of the classic aircraft of the inter-war years. Flown for the first time early in 1925, the Potez 25 saw widespread service throughout France's colonial empire, 1948 examples of the TOE (Colonial) version being produced for that specific purpose. Another 322 were exported to seventeen countries. In addition, 150 were built under licence in Poland, over 200 in Yugoslavia and twenty-seven in Portugal. Total production of the Potez 25 in France alone exceeded 4000 aircraft. Between November 1933 and January 1934 a formation of thirty-three Potez 25 TOEs, led by General Vuillemin, made a 'show-the-flag' tour of France's colonies in Africa, a venture that became known as the *Croisière Noire* (Black Cruise) and provided a considerable boost for France's military aviation prestige. During the Second World War, some Potez 25s, although long since relegated to training and liaison duties, saw action in Syria and French Indo-China.

By the mid-1930s, the Potez 25 was being replaced by the ANF Les Mureaux series of observation aircraft, developed from the Mureaux 110

parasol monoplane. The first was the Mureaux 113. It was of all-metal construction, the outer wing panels being supported by a pair of struts from each side of the fuselage. The fuselage was of deep rectangular section, the pilot being accommodated in the front open cockpit and the observer in the rear. The latter had a foldable seat and removable dual controls. The first of forty-nine Mureaux 113s entered service with the Groupes d'Observation in 1934, but only about a third of these were still operational four years later. One hundred and nineteen examples of an updated version, the Mureaux 115, were ordered for service from the mid-1930s; twenty-two of these were equipped as fighter-bombers. In 1935 the Mureaux 117R2 observation aircraft was produced, featuring strengthened wings. One hundred and five examples were eventually built, along with twelve examples of a fighter-bomber variant.



In addition to the Potez 25, the Armée de l'Air also used the Breguet 27 in the light bombing and observation roles, 130 being operated throughout the 1930s. Armand Agababian

The ANF les Mureaux 115 was a sturdy and reliable observation aircraft, well liked by its crews. ECP Armées





The Mureaux 115 gave way to the 117, which had strengthened wings. ECP Armées

In the summer of 1939 the Armée de l'Air had fifty-nine reconnaissance and observation groups, of which General Vuilleman, the Chief of Air Staff, reported:

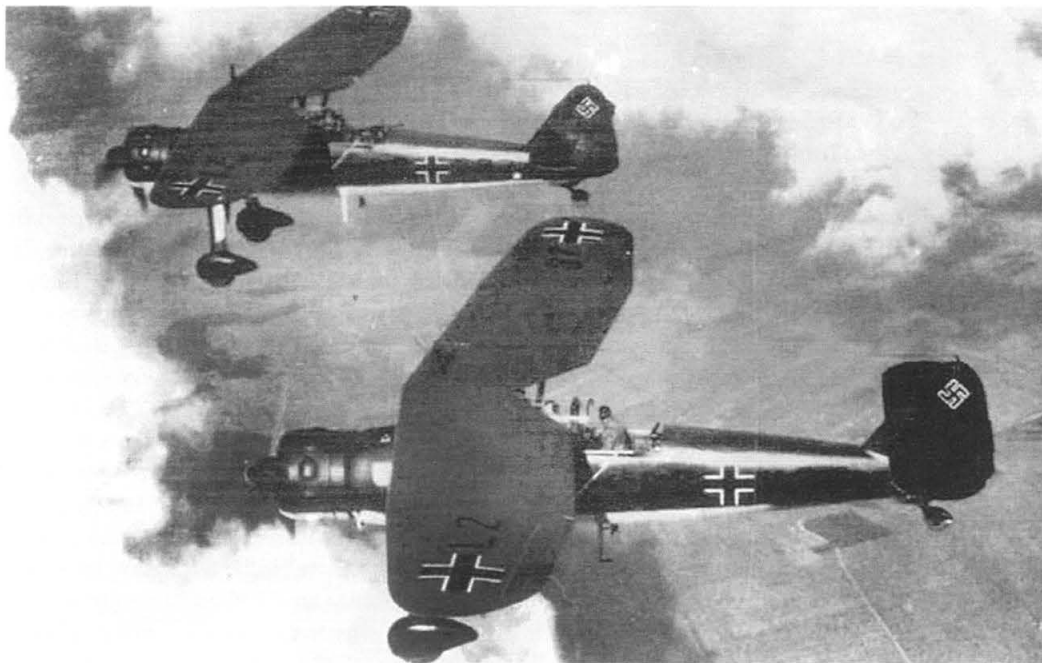
A start has been made in the re-equipment of reconnaissance units, whose condition is already much improved and which ought to make rapid progress in the near future. Re-equipment of observation units, however, may be set back for rather a long time.

In August 1939 there were three strategic reconnaissance groups, equipped with Potez 637s, while the eleven army co-operation groups operated Bloch 131s, Potez 540s and Potez 25s. The forty-five observation groups used Mureaux 115s and 117s, Breguet 270s, Potez 25s and 390s, and a small number of licence-built Cierva C.30 autogiros. Such was the antiquated state of the reconnaissance units that in September 1938 an order had been issued forbidding them to fly across the front line in the event of war; it was still in force a year later. The re-equipment programme referred to by General Vuillemin involved the new twin-engined Potez 63.11, which had flown for the first time on 31 December 1938. Five machines had been delivered by the beginning of September 1939, and the first reconnaissance groups were due to begin conversion to the type in November.

The air observation groups - Groupes d'Aviation d'Observation (GAO) - were allocated to the various French field armies. By far the biggest allocation of eighteen groups went to the First Army Group in the north; twelve more were assigned to the Second Army Group in the east; two were deployed with the Third Army Group in the south; and the remainder were assigned to the Alpine Zone of Operations or held in reserve.

GERMANY

In the early 1930s, when German rearmament began to accelerate following the Nazis' rise to power, the designer Ernst Heinkel quickly moved into a favourable position due to his willingness to design and build every type of aircraft demanded by the new regime. In 1931, in response to a demand for



Henschel Hs 126A-1s of 7(F) LG.2 pictured before the war. Bundesarchiv

a short-range reconnaissance and army-co-operation aircraft, he designed the He 46, a two-seat sesquiplane of mixed wood and metal construction with fabric covering. The upper wing had a sweepback of ten degrees. After two prototypes had flown, the small lower wing was deleted and the type was transformed into a parasol monoplane, the mainplane being strut-braced to the fuselage. The first production model was the He 46C-1, which could carry either a camera or up to 440lb (200kg) of small bombs beneath the rear cockpit. About 500 He 46s had been produced by the end of 1934, and by 1936 the Luftwaffe's reconnaissance *Staffeln* were fully equipped with the type.

From 1938, the He 46 began to be replaced by a new observation aircraft of similar design, the Henschel Hs 126. The brainchild of Dipl Ing Friedrich Nicolaus, chief designer of the Henschel company, the Hs 126 was an improved version of an earlier model, the Hs 122. The parasol-winged monoplane was of all metal, stressed skin construction, with fabric-covered control surfaces. The tandem-seated crew had covered a cockpit with a forward sliding hood over the gunner/observer position. The aircraft had excellent slow speed flight and short field characteristics; for rough muddy field operations the wheel spats could be removed. The Hs 126A-1 entered service with *Aufklärungsgruppe* 35 in the summer of 1938 and six aircraft were sent to Spain for operational evaluation. In September 1939 257 Hs 126s were in service with eleven army co-operation units. The definitive version, the Hs 126B-1, was powered by an 850hp Bramo 323A-1 radial engine.

ITALY

In the 1920s, Italy's Regia Aeronautica (Royal Air Force) made extensive use of the excellent Fokker C.V light bomber and observation biplane, which was built under licence from 1925 by the *Industrie Meccaniche e Aeronautiche Meridionali* (IMAM).

IMAM's version of the C.V was powered by a 500-hp Alfa Romeo-built Bristol Jupiter radial engine and designated Ro 1. Its planned successor, the Ro 30 three-seater, was not a success, even though it had a slightly higher performance than the Ro.1. However, the Ro 37 biplane of 1934 was a very good design. An all-metal two-seater with fabric-covered wings, tail and fuselage, and an aluminium panelled nose section, the Ro 37 was intended primarily for the tactical reconnaissance role, but it was also expected to operate in the ground attack, artillery observation, light bombing and colonial air-policing roles, as required. It was therefore comprehensively equipped, for the period, and heavily armed. IMAM catered to the primary long-range reconnaissance mission by providing unusually comfortable, well-lit accommodation for the observer and his chart table in the space between the two open cockpits. This space was covered by an overhead canopy, which also shielded the rear gun position from the slipstream, and by large, glazed side windows that could be slid open when desired. For rear defence, the aircraft carried a 7.7mm Lewis or Breda machine gun on a simple ring mount. Two synchronised, 12.7mm Breda-SAFAT heavy machine guns were mounted under the engine decking forward, an unusually heavy armament at a time when most similar aircraft mounted a single, forward-firing 7.7mm gun. Underwing racks could carry up to twelve 12 or 15kg bombs.

Over 600 Ro 37s were built up to May 1939. Five squadrons operated in Abyssinia (Ethiopia) during the Italian invasion of 1935-36, engaged in machine-gunning and anti-personnel bombing attacks, and subsequently on colonial policing operations. The Ro 37 operated successfully with the Italian *Aviazione Legionaria* during the Spanish Civil War (see below), and some 300 examples were still in service when Italy entered the Second World War in June 1940.

SOVIET UNION

In the 1920s, the principal observation and light bomber aircraft used by the embryo Soviet Air Force (or Red Air Fleet, as it was then known) was the de Havilland DH.9, many examples of which had been captured from Tsarist forces at the end of the civil war. From 1923, the Moscow Dux aviation factory began to produce copies of the DH.9, and aircraft designer Nikolai N. Polikarpov went a step further by combining the best features of the DH.9 and its predecessor, the DH.4, which had been on the verge of being licence-built in Russia before the revolution. The resulting aircraft was the R-1, the designation signifying *Rasvedchik*, or reconnaissance. The R-1, which had unmistakable DH.4/DH.9 lines, was produced in huge numbers, some 2000 examples being completed up to 1927.

It was at this juncture that another Russian designer, Andrei N. Tupolev, stepped into the picture. In 1908, at the age of 20, Tupolev had entered the Advanced Technical College in Moscow, and it was there that he first met N.E. Zhukovsky, the 'Father of Russian Aviation'. Specializing in aeronautics, Tupolev formed a syndicate with several friends and built a series of small gliders. In 1918, together with Zhukovsky, he founded the Central Hydrodynamic Institute, or TsAGI, and three years later he built his first powered aircraft, the ANT-1 single-engined sporting monoplane. This was followed, in 1924, by the all-metal ANT-2 single-engined three-seater. While this type was still being flight-tested Tupolev produced the ANT-3, a single-engined biplane which was later produced in series for the Red Air Fleet as the R-3 observation aircraft and light bomber; it was the first Russian all-metal military aircraft.

In 1929, the Red Air Fleet's R-1 and R-3 observation aircraft were put to the test under operational conditions when a crisis flared up in the Far East. The trouble started when the Chinese, under General Chiang Kai-shek, began to move large troop concentrations up to the Manchurian border to threaten the Soviet-controlled Chinese Eastern Railway, which ran through the fringes of Manchurian territory and linked the Trans-Siberian Railway with Vladivostok. In August 1929, the Russians formed a Special Far Eastern Army under Marshal Blukher, with its headquarters at Khabarovsk; its organization was still complete when the Chinese, mainly troops of the provincial Manchurian Army, began a series of raids on installations inside Soviet territory.

Blukher had sixty-five aircraft at his disposal. The majority were R-1s, which immediately began to fly reconnaissance and artillery spotting sorties, as well as attacking groups of Chinese infantry. In October, the Red Army counter-attacked in strength in an effort to reoccupy the territory seized by the troops of Marshal Chang Tsi-lin. On the 12th of that month, large numbers of Soviet troops crossed the Amur River and established a foothold in Manchuria to the south of Khabarovsk, advancing rapidly on the strategically important town of Fukdin. Throughout the advance, R-1s and other aircraft strafed ahead of the army units and bombed targets in Fukdin itself. The final assault on the town began on 31 October, and Fukdin fell three days later. The Manchurian garrison was all but wiped out, and the Soviet force withdrew across the river after blowing up enemy communications and supply dumps.

Two weeks later, on 17 November, three Soviet divisions and one cavalry brigade of the 18th Corps advanced on Manchouli, the meeting-point of the Soviet, Chinese and Mongolian frontiers, to clear Chinese troops from a stretch of railway. The Russians crossed the railway at two points and encircled the enemy in a huge pincer movement, cutting the Chinese off completely from any outside help and moving up tanks and artillery to finish them off. During this operation R-1s were called in to bomb several enemy-occupied towns. The raids had a serious effect on Chinese morale, especially since the Chinese had no aircraft in this sector to oppose the Soviet machines.

Nevertheless, the Manchurian forces fought back hard as the Russian net began to tighten, and some units managed to break out. The defence was undoubtedly aided by the fact that there was complete confusion between the Soviet infantry, tanks and artillery; there was virtually no co-ordination or effective support, and it was only air reconnaissance that saved the situation. The Manchurians surrendered on 27 November, another Chinese force was cut to pieces by the Soviet 19th Corps at Mishan, north of Vladivostok, and a shaky peace was restored on 22 December 1929, when the Chinese signed an agreement returning the railway to Soviet control.

Meanwhile, Polikarpov had developed another observation and light attack biplane, the R-5. The prototype flew in 1928 and the first examples were issued to the Red Air Force (as the Air Fleet was now known) in 1931. An excellent design, it remained in production for six years, some 5000 being built. The R-5 was produced in several versions, including the R-Z assault aircraft. From the mid-1930s the R-5/R-Z series had replaced all other types as the Red Air Force's standard observation aircraft.

THE UNITED STATES

In the months after the First World War, the chiefs of the United States Army Air Service, which had emerged with great credit from the air fighting over France in 1918, fought hard to establish the Service as a separate and autonomous air force, on the lines of the Royal Air Force. They faced enormous opposition. The Navy saw its battleships as the nation's first line of defence, and refused to countenance the possibility that air power would one day dominate, while the Army was adamant that the USAAS should remain firmly under its control. The Secretary of War concurred, but he ordered an expansion of the Air Service, together with better pay and conditions for its personnel.

Several new observation groups were formed as part of this expansion scheme. In the early days they were equipped with a miscellany of aircraft like the Curtiss JN-4 and Airco (de Havilland) DH.4, but these gradually gave way to purpose-built types such as the Douglas O-2 of 1923. It remained in

The Douglas O-2 was the US Air Service's first purpose-built observation aircraft.
McDonnell Douglas



production for nine years and was built in several variants, depending on the engine that was fitted. Around 700 examples were built, most armed with two or three Browning 0.30in machine guns.

In 1931 the O-2 was followed by the Douglas O-31, a parasol monoplane with a fully enclosed cockpit. Several derivatives were produced, culminating in the O-46A, ninety examples of which were ordered by the US Army Air Corps, as it now was.

In May 1935, the General Aviation Manufacturing Corporation of Dundalk, Maryland, a subsidiary of North American Aviation, completed a new design called the GA-15, later designated XO-47. This was an all-metal, cantilever monoplane, with hydraulically-actuated wing flaps and retractable landing gear. The design featured five water-tight compartments that were built into each wing panel, an insurance against an emergency water landing. The XO-47 had a large cockpit, seating three crew in tandem. The front seat was the pilot's position, the centre section was occupied by the co-pilot/radio operator/cameraman, and the rear area was the gunner's position, equipped with a .30-calibre machine gun. The centre seat could be folded to permit the middle crewman to lower himself to a second seat below, giving him access to the camera bay with its wide observation window. In addition to its extensive reconnaissance capabilities, the O-47 was a rugged aircraft, flew well, and was very fast for its day, with a maximum speed of 225 mph.

The O-47 was the most advanced observation aircraft ever delivered to the U.S. Army Air Corps, but on the eve of the United States' entry into the Second World War in 1941, its place was eclipsed by newer and more versatile fighter and bomber aircraft that could also perform the observation role, and were less vulnerable in combat. The O-series aircraft were also intended for air-to-ground liaison missions, but light aircraft such as Piper Cubs and Taylorcraft were better suited to this type of flying than the relatively larger and heavier O-47. The new category of L-series, for liaison, using these simpler, light aircraft, was adopted to meet this need, and the O-series designation was phased out.

THE SPANISH CIVIL WAR

When civil war broke out in Spain in July 1936 there were some 200 military aircraft in the country, most of them obsolete or obsolescent types. The bulk remained in the hands of the air arm of the Republican government, and only a very few found their way to the Nationalist commanders, General Franco in North Africa and General Mola in northern Spain. It was the Nationalists who were the first to receive substantial aid from overseas. On 26 July 1936, Franco sent emissaries to Adolf Hitler, who promised German support for the Nationalist cause, and by the end of the month eighty-five Luftwaffe personnel and six Heinkel He 51 fighters sailed from Hamburg, bound for Cadiz. The ship also carried spare parts for twenty Junkers Ju 52 bomber-transport, which had reached Spain by way of Italy. They were used to airlift thousands of Nationalist troops from North Africa to the Spanish

mainland. Further air reinforcements for the Nationalists came in August, with the arrival of nine Italian SM.81 bombers and an initial batch of Fiat CR.32 fighters. In the meantime, the Soviet government had been making plans to assist the Republicans by supplying arms and military advisers. By the end of October 1936, thirty Polikarpov I-15 fighters had arrived in Spain, along with 150 Russian personnel. The group included fifty fighter pilots under the command of Colonel Yakob Shmushkievich, who was known as 'General Douglas' throughout Russia's commitment in Spain, and it was in their hands that the I-15 - dubbed Chato (Snub-nose) by the Spaniards - made its operational debut on the Madrid front. The I-15's first combat over Spain took place on 4 November 1936, when ten fighters, all flown by Russian pilots, attacked an Ro 37 observation aircraft of the Italian Legion over the Manzanares river. The Ro 37 escaped, but two Fiat CR.32s escorting it were shot down.

The first observation type to be used by the Nationalists was the Heinkel He 46, twenty of which were supplied by Germany in September 1936. The first ten Ro 37s arrived from Italy in October and began operations on the Madrid front in October. By April 1937 the Nationalists had two squadrons of Ro 37s, four of Heinkel He 46s and one of Heinkel He 45s, each with six aircraft, for army co-operation duties; a second squadron of He 45s was formed in May. On the opposite side, the Republicans, in addition to a motley collection of observation aircraft obtained mostly from France, were operating some Polikarpov R-5s supplied by the Soviet Union. Thirty-one of these aircraft arrived early in 1937, together with about sixty R-Z attack aircraft. Both sides found it necessary to operate their observation aircraft under strong fighter escort, a practice that continued throughout the war.

All the Nationalist observation squadrons were active in the decisive Teruel campaign of January-February 1938, earning the praise of General Kindelan, Chief of the Nationalist Air Force, who wrote in a General Order of 23 February 1938:

The Hispana Brigade in its brilliant military debut, the Heinkel He 45s, Heinkel He 51s and Romeo (Ro 37) and Heinkel He 70 reconnaissance units, and the various advisory organizations and liaisons between commands, can rest assured that their efforts, given tirelessly and beyond measure, have been valuable and productive.

For the Germans in particular, whose aircrew had actively participated in the war on the side of the Nationalists, one aspect had proved especially enlightening, and that was the liaison between the observation aircraft and the Junkers Ju 87 Stuka dive-bomber, which operated in small numbers in Spain from December 1937. It was a deadly combination whose fury would shortly be unleashed across Europe.

CHAPTER FOUR

AIR OBSERVATION IN THE BATTLES OF POLAND AND FRANCE

During the campaign in Poland, which began on 1 September 1939, the Henschel 126 army co-operation units made good use of the tactics developed in Spain. One *Aufklärungsstaffel* (reconnaissance squadron) was assigned to each army corps, its crews providing the ground forces with an up-to-date assessment of the tactical situation. Daylight reconnaissance flights over the battle area were normally made at altitudes of 6500ft or lower. The normal method of operation was for the Army Command to issue its requirement to the *Staffelkapitän*, who then briefed individual crews on the task in hand. In addition to providing support with infantry echelons, one squadron of Hs 126s was assigned to each *Panzerkorps*, units so allocated being identified by the abbreviation Pz after their designation. Two *Staffeln*, 3(H)/10 and 3(F)/11, were held in reserve to provide spotting facilities for artillery batteries as required.

But it was in its capacity as a spotter for the *Luftwaffe's* 'airborne artillery' – the Junkers Ju 87 Stuka dive-bomber – that the Henschel 126 really came into its own. The combination of Stuka and Henschel operated with deadly efficiency in Poland, especially after the *Luftwaffe* had secured air superiority.

Although the bulk of the Hs 126 units operated in support of the German Army's campaign in Poland, others were operating in the west, making regular observation flights along the Maginot Line, the vast fortification extending along the Franco-German frontier. France's Mureaux observation aircraft were also active in this area in the early weeks of the period that became known as the 'Phoney War'.

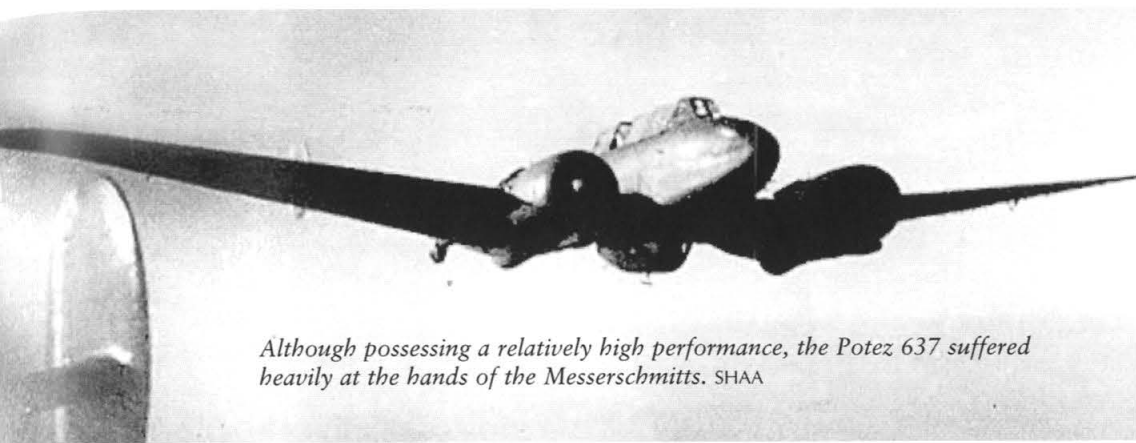
Between 4 and 7 September, the French Strategic and Tactical Reconnaissance Groups flew some forty sorties in support of a limited French advance into the Saar, a move that involved nine divisions with orders to advance up to the outposts of the Siegfried Line. The French subsequently advanced 5 miles on a 16 mile front, occupying about twenty abandoned villages. The push – greeted, incidentally, in Britain by banner headlines that proclaimed 'French Troops Flood Over German Border' – was also supported directly by sixteen of the thirty-one *Groupes d'Aviation d'Observation* of the First Air Army. Six of these groups were equipped with Mureaux 115s and 117s, the remainder with a miscellany of ancient machines such as the Potez 25, Breguet 27 and Potez 390.

It was a Mureaux 115 of GAO 553 from Strasbourg which became the first French aircraft to fall victim to enemy action. In the afternoon of 8 September, the aircraft took off from Saverne and climbed to 16,000ft to make a reconnaissance of *Luftwaffe* bases in the Karlsruhe area. It never reached its objective; it was shot down in flames by flak soon after it entered German territory and the two-man crew, Lieutenant Davier (observer) and Sergeant-Chef Piaccentini (pilot), were killed.

That same afternoon, Messerschmitt 109s made their first appearance over the western front. At 15.00 five Curtiss Hawks of *Groupe de Chasse* (GC) II/4 were providing top cover for observation aircraft operating in the Landau area when they were attacked by four 109s. After a brief dogfight Adjutant Villey and Sergeant-Chef Casenobe each claimed one Messerschmitt destroyed – the first French fighter victories of the Second World War. Another flight of Bf 109s, of II/JG 52, also patrolling the Landau area, was more fortunate; they intercepted a Potez 637 of GR II/52, piloted by *Aspirant* Hallé, and severely damaged it. With his port motor out of action, Hallé managed to escape and made a successful wheels-up landing at Herbéviller, his home base.

The real martyrdom of the French reconnaissance aircraft began on 9 September. That morning, two 109s caught a lone Bloch 131 twin-engined reconnaissance bomber at high altitude over Sulzbach, knocking out one of its engines and its hydraulics before breaking off the attack. The Bloch crash-landed at Martigny-les-Gerbonveaux with one crew member dead and another wounded. An hour later, another Bloch 131 was attacked by six 109s just inside German territory and crashed in no-man's land. The sole survivor was a gunner who managed to bale out in time, and he was wounded in the legs by a 109 which fired at him as he was coming down under his parachute.

By this time, the need for accurate intelligence of enemy movements had become so critical that, at the request of Army GHQ, some of the Air Force's bomber groups were turned over to reconnaissance work. The aircraft principally involved was the Bloch 200, and these machines made a series of daylight sorties into enemy territory without fighter escort beginning in the afternoon of 9 September. The first was carried out from Dijon-Longvic by a Bloch 200 of GB I/32, attached to the 3e *Division Aérienne*, and the aircraft returned safely to base with its engines red-hot after spending half an hour at full throttle over Germany. Two more sorties later in the day ended disastrously. At 15.30 a Bloch 200 of GB II/31 was shot down near Saarbrücken, four of its crew being killed and a fifth taken prisoner, and at 14.15 a second - from GB I/31 - was forced down in enemy territory and its crew captured. At about the same time, a Potez 637 of GR I/52, returning from a reconnaissance of the Ulm area, had a twenty-minute dogfight with two Bf 109s over Strasbourg; the enemy fighters eventually ran out of ammunition and the Potez got away with its rear gunner badly wounded. In the Wissembourg sector, a solitary Mureaux 115 put its exceptional manoeuvrability to good advantage in getting away from six Bf 109s by means of a series of tight climbing spirals, while four more 109s that tried to intercept



Although possessing a relatively high performance, the Potez 637 suffered heavily at the hands of the Messerschmitts. SHAA

two Mureaux 115s in the same sector were beaten off by Curtiss Hawks of GC II/4.

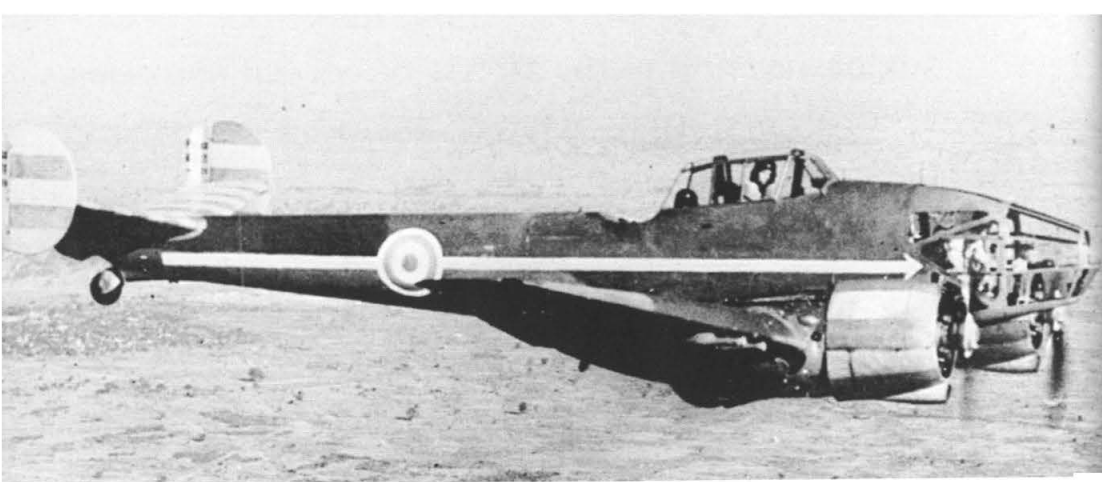
The French observation aircraft suffered more casualties on 10 September. Once again, the 109s were up in strength in the Fourth French Army's sector, and at 18.00 several of them surprised two Mureaux 115s of GAO I/520 engaged in artillery registration between Saint-Arnual and Ensheim. Despite a fighter escort of four Curtiss Hawks, both Mureaux were shot down; the crew of one was killed, but the other two airmen succeeded in reaching the French lines after coming down in no-man's land.

Sous-Lieutenant (later Colonel) Edmond Petit, a Mureaux 115 pilot with GAO I/520, recalls his experiences in this first week of the war:

We deployed from our main operating base of Chalons-sur-Marne to Delme-Morhange, near the Front, on 8 September. The next day, while carrying out a reconnaissance, I had my first encounter with flak and came home with a hole in the fuselage...On 10 September Sergeant Tacquart and Lieutenant Potier (observer) were shot down and killed by Messerschmitts, which became increasingly troublesome when we were directing artillery shoots. All their pilots had to do to find out exactly where we were operating was to head for their own flak bursts.

It was on 20 September that air fighting over the front line began in earnest. That afternoon, six Curtiss Hawks of GC II/5 were providing fighter cover for a reconnaissance aircraft in the Apach-Büdingen sector when the top flight of three French fighters was attacked by four Bf 109s of I JG/53, led by *Hauptmann* Werner Mölders. The Curtiss flown by *Sergent* Pechaud, riddled with bullets, was forced down in a field near Saint-Mihiel; a second was shot down by Mölders himself and the pilot baled out. On the credit side, a 109 was shot down by *Sergent* Legrand and another damaged by *Lieutenant* Huvet. The enemy flak was also active during the day, accounting for a Potez 637 of GR I/33 near Trèves.

On the following day, nine Morane 406 fighters of GC I/3 were detailed to escort a Potez 63 of GAO 505, carrying out artillery registration for the 5th



The Potez 63.11 was a more modern proposition than the Potez 637, but its losses were such that it could no longer operate by day. ECP Armées

Army Corps and a Mureaux 115 of GAO 507, on reconnaissance along the Rubenheim-Bliesdalheim-Altheim-Hornbach axis. Suddenly, the Potez 63 was attacked by three Bf 109s of I/JG 53, killing one of the French crew; the pilot threw the aircraft into a dive and crash-landed in friendly territory with his controls partly shot away. The Messerschmitts then pounced on a lone Morane which had gone to the Potez's aid and shot it to pieces, Werner Mölders delivering the coup de grace at point-blank range. The French pilot jumped, but his parachute failed to open.

The Moranes were in action again on the 21st, when six aircraft of GC III/2, patrolling the Alsheim-Wahlsbronn sector, sighted a Dornier Do 17 reconnaissance aircraft escorted by four Bf 109s over Zweibrücken. Breaking away from the French formation, Adjutant Romey dived through the 109 escort and attacked the Dornier. After two or three bursts the Do 17 went into a vertical dive from 18000ft and exploded on the ground. A short time later another Morane of GC III/2 became hopelessly lost over the front line and landed in error on the German airstrip at Ensheim; the pilot was taken prisoner, but with the help of a Mureaux 115 spotter the Morane was destroyed by French artillery fire before the Germans could lay their hands on it.

There were several air combats on 24 September, most of them inconclusive, but one of them nearly cost the lives of *Sous-Lieutenant* Petit of GAO I/520 and his observer, *Lieutenant* Bernard.

We took off from Morhange-Kieskastel, the closest of all the French airfields to the front, on a photographic sortie to the Sarre. Right on time, we made rendezvous with our fighter escort, the Morane 406s of GC I/3, led by Capitaine Pape. The top cover flight comprised Pape, Sergent Musset and Sergent Dumoulin, while the close escort consisted of two aircraft flown by Sous-Lieutenant Lacombe and Sergent-Chef Vinchon.

We started our photo run along the axis Sarrebruck-Deux-Ponts at an altitude of 3500 metres. I had to fly very precisely so that Bernard could

get the best results, but he was an expert aerial photographer. I found it hard to concentrate on the job in hand; our fighter flights were above us, but there was a fair distance between them and they seemed a long way off.

There was a scattering of fair-weather clouds in the sky, but that was all. It was fine. We finished the first photo run and I turned to start the second, which was parallel to the first. A quick look at our fighters reassured me that they were still in position.

I never saw the first enemy attack coming in. They must have come down in a near-vertical dive; later on, I discovered a cannon-shell hole in the upper fuselage, near the observer's cockpit. I felt a loud thud and the aircraft shuddered. Bernard opened fire at a second Messerschmitt. I took violent evasive action but the enemy fighter followed me and we were hit again. Bernard stopped firing. I looked round but I couldn't see him; only blood on the windscreen.

The German was only a few metres away. I could see him. I mean, I could see his face. There was no expression of hatred on it, just concentration. He had the advantage of surprise. I weaved hard to left and right, losing speed, and now it was his turn to be surprised; he overshot. I let him have it with my forward-firing machine gun and he disappeared.

Another pair of Messerschmitts came at me, but this time I was ready for them. I put the aircraft into a tight spiral climb, which they had no hope of following. I headed for a cloud, which was not as big as I thought, and I was soon out of it again. A German was waiting for me on the other side. He fired at me and missed, then he broke away. I tried to follow him and had him in my sights briefly. I fired, and he too vanished.

I thought about Bernard, who was wounded, perhaps even dead, and knew that I had to get him back to base as quickly as possible. There was no question of diving straight for the front line, because the Messerschmitts would have had me for sure. All I could do was to edge towards it, never flying straight and level for more than a few seconds.

Thankfully, a Morane joined me and escorted me back to Kieskastel, where we both landed. My saviour was Capitaine Pape, who landed nearby and helped me to lift Bernard from his cockpit. He was covered in blood and was weak, but he was alive and able to talk. Our aircraft was riddled with holes. Bernard made a full recovery, and we subsequently met up many times on 24 September to celebrate our good fortune.

In a different sector, other fighter pilots of GC I/3 were effectively 'bounced' by the Bf 109s. One of the French pilots, *Sergeant Garnier*, succeeded in damaging one of the enemy before he himself was hit and wounded. He broke

away and went down to make a forced landing in a field near Etting, only to be killed by a final burst from a 109 which strafed him as he was touching down. A few minutes later, a 109 was shot out of the sky by *Adjudant-Chef* Combette, while *Capitaine* Gérard - a veteran of the First World War - blew the tail off a second with a burst of cannon fire.

At 15.00 there was another fierce scrap when six Curtiss Hawks of GC II/4, escorting a Potez 637 of GR II/52 at 20,000ft over the Eppenbrunn-Hornbach sector, ran into fifteen Bf 109s of I/JG 52. After damaging a 109, which was seen to go down towards Landau trailing smoke, *Sergent* de la Chapelle was shot down in flames, although he baled out unhurt. In the ensuing dogfight two more 109s were destroyed by *Adjudants* Plubeau and Dardaine; one crashed at Niedergailbach and its pilot, *Oberleutnant* Borth, was taken prisoner.

The air battles reached their peak on 30 September, when the French fighters claimed the destruction of twelve Bf 109s, plus one probable, and a Henschel 126 observation aircraft, this being the first recorded instance of a Hs 126 combat loss in the campaign. The most savage dogfight of the day occurred right over the front line at 17.00, when five Curtiss Hawks of GC I/5 and II/5 were attacked by nine Bf 109s. The Messerschmitts shot down two Hawks on their first pass and then, joined by six more 109s, went after the others. This time, it was not so easy; they shot down and killed *Sergent* Magenz, but two of them were destroyed by *Adjudant* Genty and two more shortly afterwards by *Lieutenant* Huvet, while a fifth fell to the guns of *Sergent-Chef* Lachaux. The latter also pursued a sixth 109 deep into enemy territory and registered hits on it before being forced to break off, short of fuel.

As a result of losses sustained by the French reconnaissance units during September, all reconnaissance machines were restricted to night operations with the exception of the thirty-five Potez 637s of GR I/33, II/33, I/52 and II/52. On 3 December 1939, a plan was implemented calling for the establishment of a new strategic reconnaissance group and for the re-equipment of three groups with Bloch 174s, two with Bloch 175s and Amiot 351s, four with Bloch 175s and Potez 63.11s, and six with Martin 167s and Potez 63.11s. This scheme was to be completed by the end of April 1940.

Sweeping changes were also planned for the army observation units, threequarters of whose machines were so outmoded that to risk them in the battle area meant almost certain suicide for their crews. In October 1939, all observation groups operating obsolescent equipment were accordingly pulled back to the rear with the exception of six, retained in a reserve capacity by the First Air Army. The brunt of army observation work now fell on the fourteen active Mureaux 115 groups, later reinforced by four more groups redeployed from the Third Air Army. It was planned eventually to reinforce the observation units with Potez 63.11s, the first of which had entered operational service in mid-September, and to this end a conversion flight was formed at Toulouse in October to train instructors on the new aircraft.

Meanwhile, skirmishing continued between the opposing air forces. The French reconnaissance aircraft suffered more losses in October. On the 6th a LeO 451 of GB 1/31 was shot down by flak near Euskirchen, and on the 11th a Mureaux 115 of GAO 553 was also shot down near Lauterbourg after losing its fighter escort in poor weather. On the night of 15/16 October enemy flak claimed an Amiot 143 of GB 1/34, and the following day two Potez 637s were destroyed, one by flak near Darmstadt, the other by Bf 109s over Kaiserlautern.

November began with yet another reconnaissance aircraft loss when a Potez 637 of GR II/33 was shot down in flames south of Treves by six Bf 109s on the 5th. The following day, two Mureaux 115s of GAO I and II/506 were trapped over Plappeville by twenty-seven Messerschmitt 109s of JG 102; both observation aircraft made emergency landings and all but one of their crew members got clear. Then, after more than a month without any successes, it was the turn of the French fighters. Nine Curtiss Hawks of GC II/5 – which had been providing fighter escort for a Potez 63 of GR II/22 – swept up to the assistance of the Mureaux too late to save them, but in time to engage their attackers. In a fifteen-minute air battle the French pilots claimed four kills and four probables for no loss to themselves; three of the German pilots baled out and were captured.

The Royal Air Force, too, saw considerable action over the Maginot Line during the latter months of 1940, but as yet the Lysander army co-operation aircraft were not involved. At this time the British Air Forces in France (BAFF) were split into two echelons, the Advanced Air Striking Force (AASF) and the Air Component of the British Expeditionary Force (BEF). The AASF, commanded by Air Vice-Marshal P.H.L. Playfair, comprised ten squadrons of Fairey Battle light bombers and two of Bristol Blenheims, protected by two squadrons of Hawker Hurricane fighters. In the early weeks of the war the Battles had made brief daylight reconnaissance flights over enemy territory, but these had ceased abruptly when four out of five aircraft were shot down by Bf 109s on 30 September.

Westland Lysander of No 225 Squadron RAF, Old Sarum, June 1940. Note the racks for light bombs on the wheel spats. RAF



The other half of the BAFF, the Air Component – commanded by Air Vice-Marshall Blount – comprised two squadrons of Hurricanes, two of Gloster Gladiators, four of Bristol Blenheims and four of Lysanders. Although the Hurricanes were in action against German reconnaissance aircraft, and the Blenheims flew some reconnaissance missions over enemy territory from mid-October, for the Lysander squadrons the winter of 1939-40 was marked by a succession of exercises with units of the British and French armies deployed along the Franco-Belgian border at their war stations. The Lysander squadrons were based well to the rear, sending detachments forward as required. No 2 and 26 Squadrons operated from Abbeville-Drucat, near the Channel coast; No 4 from Monchy-Lagache in Picardy; and No 13 from Mons-en Chaussée on the Somme. A fifth Lysander squadron, No 16, would be deployed to France in April 1940.

December 1939 was a dull month, with bad weather severely restricting air activity on both sides. Reconnaissance aircraft took advantage of the occasional break to slip across the lines, and on 20 December a Potez 637 of GR I/33 carrying out a photo-recce mission between Mainz and Frankfurt was shot down by flak after being damaged by Messerschmitts. The crew of three baled out. The next day, there was an unfortunate ‘friendly fire’ incident when two British Hurricanes shot a Potez 637 of GR II/33 down in flames at Villers-sur-Meuse; there was only one survivor.

There was sporadic air fighting in January 1940, but at the end of the month the weather clamped down again, remaining virtually solid throughout February. The wiser unit commanders, realizing that the tempo of air operations would be stepped up considerably with the spring weather, took advantage of the respite to send as many of their personnel as possible on home leave. They returned, at the beginning of March, to take part in some of the most hectic fighting of the war so far. Enemy activity continued to be devoted mostly to reconnaissance, but as March gave way to April packs of fighters patrolled the front line and became increasingly aggressive. Sometimes, two or three squadrons of long-range Messerschmitt 110s carried out a sweep over French territory as far as Metz or Nancy. The Bf 110s usually stayed up very high and only engaged in combat when pressed by Allied fighters. It appeared that the Luftwaffe was experimenting with new battle formations and offensive tactics, a sure sign that a major attack was not far away.

On 9 April 1940 the Germans struck with numbing speed, not on the Western Front but in Denmark and Norway. In the ten days that followed, a hastily-assembled Anglo-French expeditionary force landed at Narvik, Namsos and Andalsnes, but after two weeks of bitter fighting the Allies had lost every foothold except Narvik itself. The battle was by no means over, but by the beginning of May the situation of the German forces in Norway had improved to such an extent that the German High Command could once again focus its attention on the West. For the Allies, the long months of unreality were over.

Soon after midnight on 10 May 1940, the crew of a French aircraft carrying out a reconnaissance between the French border and Düsseldorf sighted long convoys of vehicles, headlights full on, streaming westwards over the German roads of the Rhineland. On returning to base, he immediately tried to raise his duty officer on the telephone, anxious to pass on the news to higher authority. But the duty officer had left orders that he was not to be disturbed. It was half an hour before the pilot succeeded in getting him out of bed and rousing him sufficiently to make a report. Finally, with a sigh of relief, he finished talking. As he walked towards his billet, together with his observer, he paused; from the east there came the rumble of what sounded like thunder. He shrugged and went on his way, the warm breeze of the May night on his face. Dawn would soon be breaking. It was exactly 03.30 hours. And the 'thunder' was the massed German artillery, breaking the ground ahead of the Panzer divisions that were about to fall on France and the Low Countries.

Between dawn and dusk on 10 May, 1940, the *Luftwaffe* flew more than 1000 individual bombing sorties against targets in France, Belgium and Holland in the course of some 150 attacks. During the morning, 400 Heinkel 111s, Dornier 17s and Junkers 88s struck at seventy-five air bases, forty-seven of them in northern France, in an attempt to destroy a large portion of the Allied air forces on the ground. In fact, the *Luftwaffe* failed to achieve more than a fraction of its objectives during this opening phase; in the French Northern Zone of Air Operations (ZOAN) only four aircraft were destroyed on the ground during the initial onslaught and thirty or so damaged, while in the Eastern Zone of Air Operations (ZOAE) the only real result was obtained by the Dornier 17s of KG 2, which destroyed five Amiot 143 bombers and two RAF Hurricanes. Far greater destruction was achieved on 11 May, when the German bombers caught considerable numbers of Allied machines refuelling and rearming on their bases between sorties.

During the afternoon of 10 May the *Luftwaffe's* main effort was directed against communications, the bombers striking in particular at the major rail junctions at Tergnier, La Fère, Laon, Rethel and Hirson. Allied convoys were also attacked, mainly on the roads between Brussels and Liege, Beaumont and Philippeville and Givet and Namur. During the day's operations the *Luftwaffe* admitted the loss of twenty-six aircraft, while Allied fighters claimed the destruction of forty-nine.

Luftwaffe operations over north-east France during this phase were the primary responsibility of *Fliegerkorps* II and V, commanded by *Generalleutnant* Bruno Lörzer and *Generalleutnant* Robert Ritter von Greim. The attacks on targets in Holland were carried out by *Fliegerkorps* I and IV under *General* Ulrich Grauert and *General* Alfred Keller, although part of *Fliegerkorps* I also participated in attacks on French airfields. The *Stukageschwader* of *Generalleutnant* Wolfram Freiherr von Richthofen's VIII *Fliegerkorps* were assigned to the direct support of the Sixth Army and the 16th *Panzerkorps*.

During the morning of 13 May, which dawned bright and clear with a few

shreds of mist clinging to the Meuse and the woods on either side, the heavy artillery of the French X and XVIII Corps opened up on the river crossing points, strategic road junctions and the approaches to the Meuse. By midday, however, there was a critical shortage of ammunition. Apart from the general confusion that existed, fresh supplies coming up from the rear were subjected to incessant air attacks by the *Luftwaffe*. It later transpired that requests for further supplies of ammunition sent through urgently to HQ Second Army had never arrived, or, if they had, had been ignored.

During the morning of 13 May, the *Luftwaffe* struck the French posts on the Meuse in relatively small numbers, the forward positions being attacked by groups of up to six Stukas or medium bombers. In the afternoon, however, the full weight of *Fliegerkorps* II and VIII was suddenly turned on the real pivot of the battle in support of the armoured thrust at Sedan by the XIX and XXI Army Corps, *Luftwaffe* orders being to pin down the French defences while the German ground forces established a bridgehead. This was to be achieved by small formations of aircraft, primarily Stukas, attacking in relays, rather than by a single all-out air attack.

The first phase unfolded on schedule at 1600 hours on 13 May with a highly effective precision attack by Ju 87s of StG 77 on French artillery emplacements on the west bank of the Meuse. This was followed minutes later by a second raid, this time by the Dornier 17s of KG 2. The attacks continued for several hours and were virtually unopposed by the French fighters, which were for the most part effectively kept at bay by patrolling Messerschmitts. In other instances, French air units failed to respond to the emergency because of an appalling lack of communication between the French Army and Air Force.

Further north, the assault on the Meuse at Houx and Dinant by *General* Hoth's XV Panzer Corps was supported by the Ju 87s of StG 1 and the Dornier 17s of KG 76 and 77. For the defending French troops, the attacks were fearsome and demoralizing. Most of the French air-raid shelters were only half completed and offered hardly any protection from the onslaught. Even before the air attack was over, four brigades of German 105mm guns opened up a heavy fire on the French X Corps sector. Under cover of the bombardment, the German assault infantry launched itself across the Meuse on river boats and rafts, screened to some extent by the vast cloud of dust and smoke that swirled across the river from the bombing on the opposite bank.

By the evening of 15 May, the *Luftwaffe* had carried out 315 daylight attacks on targets in the ZOAN: 107 against airfields, sixty-six against rail targets, twenty-eight against factories or military establishments and 114 against various other objectives. Now, with the breakthrough at Sedan, the entire *Luftwaffe* effort in France and Belgium was devoted to supporting the *Wehrmacht*'s dash to the Channel coast. This was where the Henschel Hs 126 observation aircraft were at their maximum effectiveness; flying at low altitude and covered by an umbrella of Messerschmitts, they continually reported the positions and movements of Allied units. Once an Hs 126 appeared, it was a certainty that the Stukas would not be far behind. It was in no small measure

due to the activities of these spotter aircraft that the Panzer divisions were able to make such incredible headway in their race to the sea. Flying ahead of the tanks, they would pick the likeliest routes and provide up-to-the-minute information on any opposition.

By 19 May the rapid German advance to the line of the Scheldt in the north – held by the BEF – had become a direct threat to the bases of the Air Component, and orders were given to begin the evacuation of what was left of its squadrons. The first to leave were the fighter squadrons, now numbering seven and all equipped with Hurricanes, and most of the Lysanders. Of the 261 Hurricanes committed to the battle – replacement aircraft included – only sixty-six were evacuated; seventy-four had been lost on operations and the remainder had either been destroyed on the ground or abandoned because there were not enough pilots to fly them home. The last Lysander squadron to leave was No 4, which had been operating in support of II Corps. On 22 May, when only one flight of No 4 Squadron was left in France to carry out close reconnaissance for the BEF, Advanced Headquarters of the Air Component signalled home that it was virtually impossible to continue tactical and artillery reconnaissance unless a section of fighters could be provided to cover the remaining flight of Lysanders and unless fighter patrols could be flown over the battle area at agreed times and places. The enemy, it said, was constantly operating fighter patrols over the entire front, and severe Lysander losses were being sustained to no purpose. Failing direct fighter support, the Lysanders would have to discontinue tactical and artillery reconnaissance except in cases of extreme urgency.

But no fighters were available, and no more would be forthcoming. Air Chief Marshal Sir Hugh Dowding, the Commander-in-Chief of RAF Fighter Command, knew that the cause in France was lost, and that the RAF would soon be fighting bitter battles in its own skies. He could no longer afford to see his fighter resources being frittered away.

While the home-based squadrons of Fighter Command did their best to cover the evacuation of the British Expeditionary Force from Dunkirk, England-based Lysander squadrons plotted the German forward positions on special maps, which they dropped to the troops on the beaches. In performing this task, as the Lysander bore a superficial resemblance to the German Henschel 126, they were often fired on by their own side.

Also on 22 May, seven Lysanders of No 16 Squadron dropped supplies to the besieged garrison at Calais and also launched a series of fruitless and costly attacks with light bombs on enemy positions on the coast. On the following day, the squadron attacked gun positions near Boulogne, while Lysanders of No 2 Squadron dive-bombed enemy concentrations north of Calais. Further supply drops to both Calais and Boulogne were carried out by these two units and also by Nos 16, 26 and 613 Squadrons, the latter having begun to replace its Hawker Hectors with Lysanders in April 1940.

In all, the Royal Air Force sent over 170 Lysanders to France. Only fifty came back.

It is a pity that most of the squadron records were lost during the hurried evacuation, for they must have recorded many deeds of gallantry.

Henschel 126 losses during the battle, thanks to overwhelming air superiority, were comparatively light. A year later, following Germany's victories in the Balkans, no fewer than forty-eight army co-operation squadrons, all of them equipped with the Hs 126 - a total of around 400 aircraft - stood ready to support the *Wehrmacht's* drive into Russia. The establishment of an Hs 126 unit in the Russian campaign was seven aircraft, plus reserves. From the spring of 1942 the Hs 126 was joined in the short-range reconnaissance/observation role by the Focke-Wulf Fw 189 Uhu (Owl), which first flew in July 1938 and entered service in pre-production form in 1940. It was of unorthodox design, featuring two tail booms, each bearing an engine, on either side of a heavily glazed central nacelle. Sixteen prototypes and pre-production aircraft were built, followed by 848 production aircraft. Sub-variants included the Fw 189A-2, with heavier defensive armament, the Fw 189A-3 dual control trainer, and the Fw 189A-4 tactical support version with ventral armour and 20mm (0.79in) cannon. The type proved extremely successful on the Eastern Front, where it was nicknamed *Das Fliegende Auge* (The Flying Eye).

THE FORMATION OF DEDICATED AIR OP SQUADRONS – 1940–42

In Britain, the concept of the air observation aircraft, in the clearly defined sense – in other words, the use of agile light aircraft to carry out short-range reconnaissance and to direct artillery fire – had its origins with a small group of Royal Artillery officers who had learned to fly privately and who, in November 1934, formed the Royal Artillery Flying Club. Its President was Brigadier H.R.S. Massey, who was Brigadier, Royal Artillery (BRA), Southern Command, and its Secretary was Captain H.C. Bazeley, RA. Both men were keen amateur pilots, and both believed it might be possible for a properly-trained artillery officer to observe and direct gunfire while piloting a light aircraft.

In 1935 Bazeley was seconded to the Royal Air Force, where he continued to promote his ideas, as an army co-operation pilot, and during this period he and Massey (who in October 1938 was promoted Major-General and appointed Director of Military Training in the War Office) formulated the detailed concept of the Air Observation Post. The key ingredients were a gunner pilot, a highly manoeuvrable light aircraft able to operate from small fields near the gun positions, and a two-way radio. It would, Bazeley pointed out, be far simpler to teach trained Gunner officers to fly a light aircraft than it would be to teach RAF pilots the complete science of gunnery. In general, the small, agile and unarmed Air Observation Post, operating at low level and using whatever natural cover was available, would operate at a depth of 3 or 4 miles into enemy territory, beyond which the responsibility for artillery observation would be taken over by the RAF's army co-operation aircraft.

In June 1938 the Army Council placed the concept before the Air Council, who in December agreed to participate in a trial of the Flying Observation Post (FOP) as it was then termed. The trial was to be arranged between the Air Officer Commanding No 22 (Army Co-operation) Group and the Commandant, School of Artillery, Larkhill. Captain Bazeley and three other Royal Artillery officers seconded to the RAF were detailed to test the concept using the Hawker Audax and the Westland Lysander, both of which proved to be too fast and insufficiently manoeuvrable. Various types of light aircraft and the latest mark of the Cierva autogiro were then tried, with far better results. Pilots found that they were able to detect targets regularly at up to 3000 yards, and even up to 4 miles in the best weather conditions. They also found that they could evade simulated attacks by the RAF's latest monoplane fighters, the

Hurricane and Spitfire, thanks to their agility.

The trials were still in progress when war broke out in September 1939. In the meantime, the Army Council went off at a tangent and proposed that the army be provided with 250 small and cheap ground attack aircraft for use in the immediate vicinity of the front line, because the heavy, slow and vulnerable Lysander was as unsuited to the ground attack role as it was to that of air observation. The idea that the army should have its own miniature air force caused some dismay, particularly among the members of the Air Staff, who now decided that an army AOP organisation equipped with light aircraft might not be a bad thing after all. This view was reinforced in January 1940 by a memo from No 22 Group HQ, which commented that;

If artillery observation of the type envisaged proved to be practicable, it would obviously revolutionize present methods of Army Co-operation, and probably merit the development of a specific type of aircraft for the purpose with the consequent saving in our expensive types of Army Co-operation aeroplanes and highly trained crew.

It was decided to investigate the AOP concept under operational conditions in France, and Captain Bazeley was instructed to form a unit known as D Flight at Old Sarum in Wiltshire, the home of No 1 School of Army Co-operation (and, as a matter of interest, No 110 Squadron Royal Canadian Air Force, the first RCAF unit to deploy to the United Kingdom, which arrived with its Canadian-built Lysanders in February 1940).

D Flight was to deploy to France and, after a period of working-up with the British and French artillery, was to embark on AOP operations with the French Army in the Saar sector. The pilots would be Bazeley, two from the Royal Artillery (Captains Joyce and Davenport) and one from the RAF (Flying Officer Inglefield). It sounded simple enough in theory, but in practice it was anything but. Weeks went by, and D Flight still had no suitable aircraft. The best options appeared to be two high-wing monoplanes, the Stinson Voyager and the Taylorcraft Model D, and on 19 April 1940 three of the latter aircraft, plus the Stinson, went to Mailly in France to train with the Royal Horse Artillery and the 1st Light Anti-Aircraft Battery RA. On 9 May, Bazeley (who was now a Major) and Major A.G. Matthew, RHA, flew to the Saar sector to make a preliminary reconnaissance. Their stay was short-lived. On 10 May the Germans launched their offensive, causing Bazeley and Matthew to rejoin D Flight in some haste. Bazeley at once moved the flight away from the airfield, which was bombed soon afterwards, and concealed his aircraft under cover close to convenient grass landing strips. He ordered his ground party to proceed west of Paris and return to England on their own initiative, which they did, together with their equipment. On 19 May pilots and aircraft flew to Dieppe, returning to Old Sarum the next day on the instructions of the War Office.

The campaign in France confirmed what Bazeley and his colleagues had known for some time: that aircraft like the Lysander were unsuitable for the air observation of artillery fire. D Flight remained in existence, albeit on a

rather informal basis until it was officially re-established at Larkhill, Wiltshire, in August 1940. Larkhill had been associated with military aviation since 1909, and had been one of the principal bases for aircraft taking part in the annual army exercises between the wars – although in fact they operated from various convenient strips on Knighton Down.

Major Bazeley's D Flight was Larkhill's first permanent unit. It immediately set about its training task, first with two Royal Artillery officers, and then with five more who had been taught to fly at RAF elementary flying training schools on Tiger Moth biplanes. On 1 December 1940, with the formation of Army Co-operation Command within the RAF, D Flight came under the operational and administrative control of No 70 Group, which was commanded by Air Vice-Marshal T.B. Cole-Hamilton, a firm supporter of AOP.

His superior, however, was unconvinced that AOP could operate in a hostile environment without suffering unacceptable losses. In his case, this viewpoint was entirely understandable; the Air Officer Commanding-in-Chief, RAF Army Co-operation Command, was Air Marshal Sir Arthur Barratt, who had been AOC the British Air Forces in France.

There was still controversy over which aircraft was best suited to the AOP task. Somewhat prematurely, the War Office had placed an order for one hundred Stinson Vigilants from the United States, delivery being anticipated in March 1941. The Vigilant, designated L-1 in the US, was the military version of the civil Stinson Model 74. Powered by a Lycoming radial engine, and equipped with full-span automatic slats on the leading edge of the wings and pilot-operated slotted flaps on the trailing edge, the Vigilant was well suited operations from short fields; it was on order for the US armed forces. The first batch was duly shipped, in crates, under some hundreds of tons of cheese, and all but four arrived crushed – an unfortunate incident that in the event turned out to be fortunate, for the Vigilant was too heavy and lacked the manoeuvrability for the AOP task.

The Army therefore opted for the lighter and more manoeuvrable Taylorcraft Plus D, which was built under licence by a small engineering firm in the Midlands, Taylorcraft Aeroplanes (England) Ltd. One hundred Taylorcraft Model Ds were ordered, and later received the military designation Auster Mk 1. Meanwhile, the future of AOP was becoming increasingly assured, thanks to the intervention of General Sir Alan Brooke,

The Stinson Vigilant (O-54) was originally ordered by the British War Office, but in the event the Auster was used instead. Ron Dupas collection





Pilots, observers and ground personnel of No 653 AOP Squadron. Peter Coles

Commander-in-Chief Home Forces and the most senior serving officer of the Royal Artillery. In April 1941, Brooke wrote that he would be glad;

...if the Air Ministry may be clearly informed that the Army considers the AOP essential, and may be pressed to provide the necessary aircraft at the earliest possible date.

On 1 August, 1941, the first British Air Observation Post squadron, No 651, formed at Old Sarum in the RAF Order of Battle under the command of Squadron Leader E.D. Joyce, Major Bazeley assuming command in October. At Larkhill, D Flight, which had provided the nucleus of No 651 Squadron, became No 1424 Flight; it was later expanded into No 43 Operational Training Unit (OTU), moving to Old Sarum.

Four more AOP squadrons - Nos 652, 653, 654 and 655 - formed at Old Sarum in the course of 1942, and a fifth, No 656, formed at Westley, Suffolk, at the end of the year.

But it was No 651 Squadron that would see early action.

THE UNITED STATES

The establishment of the Air Observation Post in the United States Army began in much the same way as in Britain, with the enthusiasm of a small group of dedicated men.

In 1940 Joseph McCord Watson, Jr., a young artillery officer, began experimenting with the concept of artillery fire adjustment from small aircraft. Convinced that the concept was viable, he asked for two Piper Cub light aircraft to be made available for further trials during Army manoeuvres conducted at Camp Beauregard, Louisiana, in August of that year. The trials proved successful, despite the absence of radio equipment in the aircraft.

In the summer of 1941, the Chief of Field Artillery of the United States Army, Major-General Robert M. Danford, paid a visit to the British School of Artillery at Larkhill, saw the Air Observation Post concept in action, and was impressed. Danford was already aware that aircraft such as the Stinson Vigilant, by now standard observation equipment in the US Army Air Force, were not always available to provide artillery spotter support when needed, and his experience at Larkhill consolidated his opinion that lightweight

aircraft, piloted by artillery officers and dependent on ground commanders, could do a better job. Interest in the concept of using small aircraft for fire adjustment became more widespread as a result of an article by Major William W. Ford, *Wings for Santa Barbara*. The article was published in the Field Artillery Journal in April 1941.

In the summer of that year, Army GHQ conducted manoeuvres in Louisiana, Tennessee, Texas, and the Carolinas. Three light aircraft manufacturers, Piper, Taylorcraft, and Aeronca, placed eleven aircraft at the disposal of the Army for the duration of these exercises. The majority of these aircraft were Piper J-3 Cubs, which were nicknamed 'Grasshoppers' by Major-General Innis P. Swift, commanding general of the 1st Cavalry Division. The nickname was to stick. In all, the eleven aircraft flew some 400,000 miles in the course of 3000 sorties.

After the 1941 manoeuvres, General Danford renewed his efforts to obtain War Department permission to conduct formal tests of light aircraft attached to Field Artillery units. On 8 December 1941, the day after the Japanese attack on Pearl Harbor, a War Department memorandum authorized Field Artillery to proceed with the proposed tests and directed the AAC to make 28 YO-59 (the military designation applied to the Piper J-3 Cub) aircraft available to the Field Artillery as soon as practicable.

With the new liaison 'L' classification introduced on 2 April 1942, the YO-59 became the L-4, the aircraft most widely used by organic Army Aviation during the Second World War. Some Taylorcraft L-2s and Aeronca L-3s were also used, but they were deemed to be less satisfactory. The L-4, like its civilian counterpart, was simple in construction and performance. The aircraft could take off in less than 500ft fully loaded. The Grasshopper accommodated a pilot and observer, with radio gear, in tandem seating. Frequently, L-4s flew with the access doors removed to improve on their already superb visibility. Later, in Alaska and the Aleutian islands, L-4s mounted EDO floats, and occasionally, skis.

On 2 January 1942, Lieutenant Colonel William W. Ford became director of air training at Fort Sill, Oklahoma, for the purpose of training a group of licensed pilots in the techniques of aerial artillery spotting from small aircraft. Ford selected Major Gordon J. Wolf, a Field Artillery reservist, as his executive officer. First Lieutenant Robert R. Williams and Second Lieutenant Delbert L.

The little Piper J-3 (YO-59, L-4) Cub, 5673 examples of which were delivered to the US military between 1942 and 1945. Source unknown





The Aeronca L-3 (O-58) also served in the observation role, although in much fewer numbers than the L-4. In all, 409 were built. Gordon V Hubbard

Bristol assisted Ford and Wolf in setting up the programme; nine civilian flight instructors also joined the team.

Training began on 15 January at Fort Sill's Post Field with twenty-four Piper J-3 Cub aircraft furnished by the Army Air Force. The students, who became known as the 'Class Before One,' consisted of both officers and enlisted men. Upon completion of the training on 28 February, the detachment was divided into two groups for field trials. Flight A, comprising six officers and eight enlisted men, was sent to Fort Bragg, North Carolina, and then to Camp Blanding, Florida, for trials with the 13th Field Artillery Brigade, while Flight B, consisting of Major Wolf, six other officers, and seven enlisted men, was sent to Fort Sam Houston, Texas, for trials with the 2nd Infantry Division artillery.

The trials were completed in late April of 1942, and amply vindicated the light aircraft artillery spotter concept. The establishment of organic air observation for the Field Artillery on the basis of two light aircraft for each artillery battalion and two for each brigade, division, and group artillery headquarters, without affecting existing obligations of the AAF, was approved by Brigadier General Mark Clark, chief of staff to the commander of the Army Ground Forces, and in June 1942 a Department of Air Training was established in the Field Artillery School at Fort Sill.

Maintenance was an important aspect of the training programme from the beginning. The first class for mechanics began in July 1942. Lieutenant Marion J. Fortner, an aeronautical engineer and a member of the 'Class Before One', was primarily responsible for the development of maintenance courses for both pilots and mechanics.

Initially, all tactical flight training students were already holders of civilian pilots' licences.

The preliminary training phase comprised nine weeks of liaison pilot training at Pittsburgh, Kansas, and Denton, Texas. After primary flight instruction, the new pilots received from five to ten weeks of advanced tactical training in the Department of Air Training, Fort Sill.

The implementation of the training system had come only just in time. Within a matter of weeks, the American spotter crews, like their British counterparts, would be going to war.

CHAPTER SIX

AIR OP IN THE BATTLE FOR NORTH AFRICA, SICILY AND ITALY

During the North African campaign, which began following Italy's entry into the war in June 1940, a series of early and decisive victories by British and Commonwealth forces in the winter of 1940-41 were negated when, in March and April, General Rommel's Afrika Korps, after consolidating Tripolitania, launched an offensive that pushed the British forces back into Egypt in a matter of weeks and enabled the Germans to lay siege to the vital port of Tobruk. Air power was not a decisive factor in these operations, for although the necessity to provide air units for operations in Greece, which had been invaded in April, had whittled down the RAF in North Africa to a mere four squadrons (one of Blenheims, one of Lysanders and two of Hurricanes) the strength of the *Luftwaffe* and the *Regia Aeronautica* in the theatre was also very weak at this stage.

The Middle East Command's Lysander Army Co-operation squadron was No 6. At the start of Rommel's offensive its 'A' Flight had just equipped with tactical reconnaissance (Tac R) Hurricane Mk Is and was at Agedabia, flying reconnaissance sorties over Tripolitania. With the Germans advancing rapidly 'A' Flight moved back to join 'B' Flight at Tobruk, where 'B' Flight took over the Hurricanes and ranged themselves alongside No 73 Squadron, whose Hurricanes were tasked with defending the harbour. No 6 Squadron was kept very busy during the battle for Tobruk, as it was the only artillery co-operation unit within the perimeter. The squadron war diary reflects the grimness of the period:

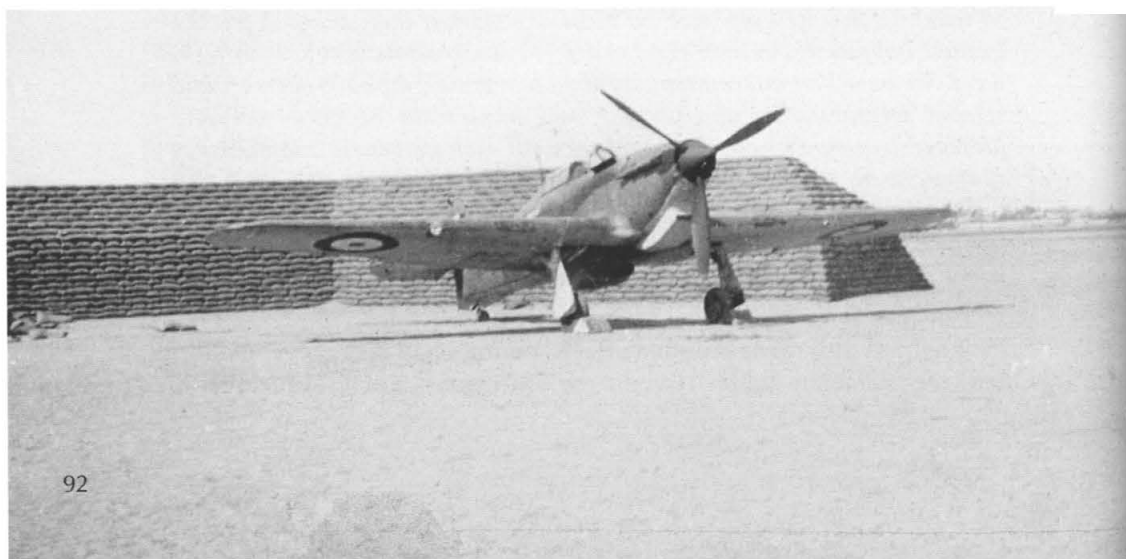
May 2nd-6th. These last few days have been eventful in the extreme; so much so that looking back on them, it is almost impossible to put the various happenings in their right order or even to allot them to their right days. We have had intermittent shelling; worse still, we have been ground strafed several times, and on one very unpleasant occasion we were attacked by twenty-two dive bombers with such fierceness and accuracy that we were on the road to believing that the German airmen had a personal grudge against us...It is becoming increasingly difficult to operate. Our serviceability has dwindled to such an extent that, at the moment, we have only one machine that is flyable and that won't change pitch and can, therefore, only take to the air for ten minutes.

Enemy fighters also made repeated attacks on the small RAF force in Tobruk. Often, the attacking fighters caught the Hurricanes and Lysanders as they

were landing, damaging the aircraft and wounding the crews. No 73 Squadron, decimated after almost continuous fighting, was withdrawn on 25 April 1941, and the last few Lysanders of No 6 Squadron left Tobruk early in May. This left the Hurricanes of 'B' Flight as the only operational aircraft in the Tobruk perimeter, and the only 'eyes' able to direct the British artillery. The situation could not continue. On 10 May 1941 the Hurricanes were so depleted by enemy action and unserviceability that it became necessary to withdraw them to Maaten Bagush.



Tactical reconnaissance Hurricanes in the Western desert, 1942. The Hurricane acted in the artillery observation role when necessary. W. McBride



The fact that the Hurricane was compelled to operate in the artillery spotting role in the first place was a measure of the serious lack of a true Air OP aircraft. In the Western Desert the Germans came closest to deploying one such type in the shape of the Fieseler Fi 156 Storch (Stork). A remarkable aircraft, the Storch was fitted with powerful high-lift devices that permitted it to take off in only 70 yards, land in 20 yards and virtually hover in a 25mph headwind without any loss of control. The result of a 1935 requirement for an army co-operation, casualty evacuation and liaison aircraft, the Fi 156 first flew in the spring of 1937 and entered service later that year. About 2900 examples were eventually built, the main variants being the unarmed Fi 156A model, the Fi 156C armed model in four sub-variants, and the Fi 156D air ambulance model in two sub-variants. The Storch was widely used on all fronts, and was noted for its part in the daring rescue by German commandos of the Italian dictator, Mussolini, from a tiny plateau on the Gran Sasso in 1943.

The Storch saw limited use in the artillery co-operation role in North Africa, and was a much better proposition than the Henschel Hs 126. Only one Hs 126 unit, 4(H)/12, was deployed to North Africa, but by mid-1942 the Henschels had been replaced by fighter-reconnaissance versions of the Messerschmitt Bf 109 and Bf 110. In the desert battles of 1941-42, characterized by the rapid movement of armoured formations, the fast tactical reconnaissance aircraft was the most valuable asset; the Air OP aircraft's baptism of fire would come in the hills of Tunisia.

On 23 October 1942 the British Eighth Army launched its major counter-offensive against Rommel's *Panzerarmee Afrika* at El Alamein. On 8 November, Anglo-American forces made simultaneous landings in Morocco and western Algeria: Operation *Torch*. Apart from the tragic and abortive Dieppe operation of August 1942, Operation *Torch* was the first large-scale amphibious operation undertaken by the Allies, and was supported by an armada of warships that included seven British and five American aircraft carriers. It was on one of the latter that the first four American AOP pilots arrived in theatre, and they arrived to a less hospitable welcome than they would have wished.

On 10 October, 1942, Captain Ford E. Allcorn, of the department of Air Training at Fort Sill, was ordered to report to the 3rd Infantry Division at Camp Pickett, Virginia, where a group of liaison pilots had been assembled. Allcorn was ordered to select three pilots from this group and report to the 3rd Division Artillery Commander at Hampton Roads, Virginia. The pilots selected by Allcorn were Captain Brenton A. Devol, Jr., and Lieutenants John R. Shell and William H. Butler.

At Hampton Roads the group was briefed on the forthcoming invasion of North Africa. They were told that three Army Air Force YO-59s (L-4s) were aboard the fleet carrier USS *Ranger* and that they were to fly them ashore during the invasion. After receiving necessary maps of the beachheads in the invasion area, Captain Allcorn and his group boarded the destroyer USS

Dallas, from which they transferred to the *Ranger* at Bermuda. To their disappointment, the L-4s that had been allocated were far from new. The greater part of the voyage from Bermuda to North Africa was spent replacing and doping fabric, tuning the engines and installing SCR 609 radio sets.

The *Ranger* was the leading vessel of the US task force covering the American landings at Casablanca. On Sunday 8 November, the first waves of American and British troops hit the beaches at dawn. At first, French resistance was relatively light. Vichy shore batteries opened fire and were answered by the guns of the assembled surface ships.

As the battle progressed, French resolve strengthened and several French destroyers and submarines sortied against the Allied forces outside the harbour. *Ranger's* Wildcats and Dauntlesses bombed and strafed the French ships and targets ashore. They also engaged in unexpectedly intense aerial encounters with their French opponents. In the first battles, sixteen Vichy fighters were shot down for the loss of four Wildcats. Even biplane Curtiss SOC liaison floatplanes contributed by breaking up a French tank column with depth charges using impact fuses. Operating from cruisers and battleships, the SOCs provided valuable artillery spotting facilities in the early stages of the invasion.

On the 9th the Army aviators received orders to take off. A request that the units ashore be informed that the L-4s would be approaching from seaward was denied by the *Ranger's* skipper, who refused to break radio silence. The seas were moderate but the *Ranger* had been under torpedo attack and was running at full speed of about 25 knots. Consequently, the aviators had to take off in a 35-knot headwind about 60 miles at sea. "Taking off was no chore," Captain Allcorn recalls. "Some of the crew held the plane back while I gunned it. I was in the air almost as soon as they let go." At about 1400 Captain Allcorn took off first (in Cub 204) and made a 360-degree turn before joining up with the other two aircraft.

The Cubs headed towards the beachhead in an echelon right formation at about 2000ft. The plan was to fly to Fedela, where a racetrack had been selected for use as a landing strip. About 3 miles from shore, as the aircraft were approaching the cruiser USS *Brooklyn*, it was decided, for no apparent reason, to switch to an echelon left formation. The aircraft were now abreast of the cruiser, and to Brooklyn's gunnery officer it looked as though they were setting up an attack pattern. He could find nothing that resembled the L-4 in the aircraft recognition manual, and as the fleet had already been subjected to several air attacks, he was taking no chances and ordered the Brooklyn's gunners to open fire.

Captain Allcorn noticed a gun flash aboard the Brooklyn and almost instantly a 5-inch shell exploded in the position Lieutenant Shell's aircraft had just occupied. The three aircraft immediately separated and dived for the surface. Allcorn passed directly over the bow of the destroyer at about 100ft and received no fire. However, as he headed towards the shore, almost all the 200 ships in the convoy opened fire on the L-4s with 20mm guns, despite the

fact that the aircraft carried black and white recognition markings. Lieutenant Butler, piloting one Cub (with Captain Devol riding as observer) and Lieutenant Shell flying the other headed north and away from the invasion beach; Butler succeeded in crash landing near a French fort behind the Vichy lines. Captured and held prisoner, they rejoined their unit after the French surrendered. Lieutenant Shell managed to land on the race track at Fedela that was their objective, but when he attempted to take off again to try to direct artillery fire, he encountered such concentrated friendly small-arms fire that he had to land immediately.

Meanwhile, Allcorn headed for the beach, skimming low over the waves. About 100 yards out he turned and headed parallel to the coast for Fedela, receiving fire from shore installations most of the way. He flew about 3 or 4 miles between the swells until he was off Fedela. When he pulled up to head inland, units of the 2nd Armoured Division riddled the Cub with .30 calibre machine gun fire. Captain Allcorn remembers his windshield disintegrating and portions of the cockpit being shot away. He recalled,

I stayed as low as possible and as I got farther inland I realized I was not going to get to the racetrack and that I was getting ahead of the Allied advance.

Suddenly, Allcorn was hit in the right leg with a burst from a machine gun. The L-4's engine was also hit, and burst into flames. Allcorn sideslipped the aircraft into the ground in a controlled crash, then crawled from the cockpit and dragged himself about 50ft away. Sitting up, he watched the L-4 explode and burn. Allcorn was picked up shortly afterwards by friendly civilians and taken to an American first-aid post, where he discovered that he had been hit five times. He retired from the US Army as a colonel and carried the bullets in his leg for the rest of his life.

As for the other two pilots involved in this unfortunate friendly fire incident, Lieutenant Butler survived the war, but Lieutenant Shell was later killed near Mateur, Tunisia, by a German 88mm round. At the time he was the aviation officer of the 1st Armoured Division. Captain Brenton Devol, who had flown from the *Ranger* as Butler's passenger, also survived.

Several more L-4s and Army aviators arrived in North Africa before the end of November, and were assigned to armoured and infantry divisions, but there were never enough pilots and aircraft to support all artillery units. A programme was established for training additional pilot-observers in North Africa, but it encountered bureaucratic hurdles and achieved only limited success.

The Tunisian campaign eliminated any lingering doubts that the L-4s could survive in a hostile environment; as it turned out, their survivability was higher than that of most other combat types, and it was enhanced by new tactics developed by the American pilots. If attacked by enemy fighters, the tactic was to roll over and dive towards Allied anti-aircraft batteries, which would then open fire on their pursuers and hopefully drive them off; their defence against enemy ground fire was their radio, with which they could

direct artillery fire on the enemy battery. The result was that, when the L-4s were in the air over enemy lines, enemy aircraft tended to stay away, and enemy anti-aircraft batteries tended to hide. In many cases, in fact, an L-4 was kept in the air during daylight hours for its counter-battery effect, not only on enemy artillery but also on anti-aircraft batteries.

No 651 Squadron RAF, meanwhile, had approached its deployment to North Africa with caution, having sailed from the Clyde in the follow-on convoy with eight crated Auster Mk Is. These were accompanied by eleven Royal Artillery officer pilots, thirty-nine RA and twenty-five RAF other ranks, a staff car, three wireless trucks, ten three-ton lorries and ten motor cycles. The squadron, under the command of Major H.C. Bazeley, was earmarked to support the British First Army.

The convoy reached Algiers, the British landing area, on 12 November 1942, and the Austers were all assembled by the 16th, the first three aircraft – flown by Major Bazeley, Captain Neathercoat and Captain Warburton – leaving for Bone, the easternmost of the invasion ports, on 17 November. By 21 November seven aircraft had reached Bone; the eighth, which was unserviceable, was following by surface transport. The seven airworthy Austers concentrated with 78th Division south of Bone, one flight of three aircraft moving up to Souk el Arba.

The plan was for an Infantry Brigade, with a Field Regiment in support, to drive on Tunis by two routes, one following the northern coastal road and the other travelling inland. The southern column was to be preceded by a small armoured force from 17/21st Lancers, moving on Tebourba, south of Tunis. The plan failed because of unexpectedly strong enemy resistance, particularly at Tebourba on the 28 and 29 November, and on 5 December the British force withdrew to the Medjerda valley. It was during this action that No 651 Squadron won its first awards for gallantry, the first going to Captain G.E. Billingham, who received the Military Cross. The citation reads:

On 28th November, 1942, Captains Billingham and Newton of this unit flew to an ALG at J6444 on their way to co-operate with 9/13 Med. Battery, RA, and 132 Field Regt. They were attacked whilst landing by four Me 109s, and Capt Newton shot down, and Capt Billingham's aircraft damaged (though subsequently repaired). Capt Billingham, who landed first, ran to the assistance of Capt Newton across the field, which was being machine-gunned. He found that Capt Newton had escaped though his aircraft was burnt out. Capt Billingham moved his section and flew his aircraft to another ALG at Tebourba on 29th November and co-operated with 9/13 Med. Battery, carrying out a sortie at 12.00 hours that day. The same day the order was given that no flying should be done without fighter cover as the air situation was so unfavourable.

Capt Billingham continued to work with his Battery and sent back much valuable information about the air and ground situation. On 30th November the ALG and adjacent farm was shot up by enemy tanks, and Capt Billingham placed his section at the disposal of the local Infantry



The Taylorcraft Auster had its baptism of fire in Tunisia. Seen here is a Mk III, which had improved cockpit visibility. Peter Coles

Commander who took up an all-round defensive position, Capt Billingham's section occupying one sector and acting as infantry. On the 1st December the ALG was bombed, machine-gunned and shelled. During the day Capt Billingham reported six tanks in a farm and these were shelled by our artillery.

That night OC Northamptons, whose battalion was occupying the farm, had to withdraw and wished Capt Billingham to go with him for safety. This Capt Billingham felt he could not do, and keeping a volunteer (his rigger, LAC Pennell) with him, remained. He sent his section and section vehicle back with the Infantry and he and LAC Pennell hid in a hut during the night. Before dawn they stole out, started the engine and took off, although enemy tanks had already driven in on the other side of the farm, and they were subjected to machine-gun fire. Capt Billingham landed his aircraft at the Squadron ALG at Oued Zarga shortly after first light on 2nd December. Capt Billingham throughout these four days behaved with great gallantry and displayed the highest devotion to duty. He and his section set a very high standard of discipline to other units at the farm under very trying circumstances. Their conduct throughout was exemplary.

The second award, of the Military Medal, went to Aircraftman First Class (AC1) Bowden, whose citation reads:

On the 30th November, Capt Newton of this Unit was ordered back to HW RA, 78 Div., with a situation report by OC 132 Field Regt. He left his section in charge of AC1 Bowden at his ALG near Tebourba. Later in the day this LG had to be abandoned as our infantry were driven to the south. AC Bowden took his section with their weapons into the hills. Two hours later they returned, hoping to move their vehicle, but were driven off by machine-gun fire. They returned at dark and spent that night in their vehicle. Next day they were again forced to take to the hills by machine-gun fire, but in the afternoon decided to try to move the truck under cover of a move forward which was being made by some American tanks. The subsequent withdrawal of these tanks forced the section to take to the hills again, but AC Bowden decided to chance it and returned with his men to the truck and extricated it under cover of darkness, and reached the Squadron ALG at Oued Zarga at 04.00 hours on 3rd December. Throughout this period AC Bowden had shown great powers of leadership, determination and devotion to duty, in that he steadfastly refused to abandon his vehicle. The other men of his section loyally supported him and together they brought away the vehicle and all aircraft stores without loss, although the vehicle was damaged by enemy fire.

The fighting in Tunisia was hard and bitter, and was brought to a temporary halt by the winter mud that made movement impossible. In January 1943 No 651 Squadron was brought up to full strength with the arrival of 'C' Flight; this was assigned to 6th Armoured Division, the other already being assigned to 46th Division ('A' Flight) and 78th Division ('B' Flight). At the end of January Major Bazeley, later to be awarded the DSO for his magnificent efforts in commanding the squadron, was sent home and his place was taken by one of his flight commanders, Major Neathercoat.

Enemy fighters were very much in evidence. The latest model of the Messerschmitt 109, the 109G, was in action with *Jagdgeschwader* 27, 53 and 77 in Tunisia, and the heavily-armed A-4 ground attack version of the Focke-Wulf Fw 190 was also deployed.

But the venerable Junkers Ju 87 Stuka dive-bomber, which had caused the Allies so much trouble in earlier campaigns, continued to operate in Tunisia under strong escort with *Stukageschwader* 3, and was in frequent action.

AOP pilots conducting artillery shoots also had to keep an eye on the sky, and in this they were usually helped by the batteries they were controlling. As one pilot reported:

'While at 600ft I received the warning 'Bandits', with the direction from which they were coming. I turned and saw about a dozen Ju 87 dive bombers and several escorting Me 109s at about 1500-2000ft, coming towards me. I dived to ground level and flew evasively over low, dark wooded hills which I had previously chosen as best suiting the aircraft's

camouflage...I waited till I saw the bombs fall and after giving time for the raiders to clear off, returned to the landing ground. The Troop throughout gave me clear and repeated warnings.

In March 1943 a second AOP squadron, No 654 (Major T.J.C. Willett) also arrived in North Africa, its crated Austers being unloaded at Algiers on the 4th. It was a month before it reached the front, and by this time the German and Italian forces were fighting a desperate action to extricate themselves from the trap that was about to snap shut by the junction of the First Army and General Montgomery's Eighth. Both 651 and 654 Squadrons were assigned to the Eighth Army for the final Allied offensive, during which they encountered a very effective organization called Army Group Royal Artillery (AGRA), in which all artillery resources were concentrated under one command and were able to be moved from one corps front to another as the situation required.

On 13 May, 1943, the Axis forces in Tunisia surrendered. For the British AOP pilots, the campaign had been a valuable learning curve. New operational techniques had been put into practice, including the use of oblique aerial photography and the direction of artillery shoots at night, which had proved to be perfectly feasible. Only one pilot had been lost on operations during the entire campaign.

SICILY AND ITALY

On 10 July, 1943, the Allies invaded Sicily, having first taken the island of Pantelleria. Initially, US Navy Curtiss SOC spotter aircraft catapulted from cruisers were used to co-ordinate naval gunfire support, and enjoyed considerable success, but later in the campaign the naval gunners came to rely more on land-based AOP aircraft. Two flights of Austers, one each from Nos 651 and 654 Squadrons, attached to 13 and 30 Corps of the Eighth Army, were shipped to Sicily on tank landing ships and driven directly to landing grounds some 50 miles from the invasion beaches, where they were assembled and ready for operations by 20 July. The first operational shoot with the Navy was carried out at the end of July, when an Auster of 651 Squadron directed naval gunfire from the monitor HMS *Erebus* on to an enemy ship in Catania harbour. The vessel was damaged and put out of action.

On 4 September, with Sicily secured, Montgomery's forces began crossing the Straits of Messina to the Italian mainland against virtually no opposition and under cover of a heavy bombardment, and the next day a flight of 651 Squadron's Austers landed at Reggio, becoming the first Allied aircraft to be based on the continent of Europe since the collapse of Greece in 1941.

On 8 September the Italian government accepted armistice terms set out by the Allies, and on the 9th an Anglo-American force carried out an amphibious landing at Salerno, this time in the teeth of strong enemy opposition that prevented the invasion force from reaching its initial objectives, despite heavy naval fire support. The situation might have been much worse, had not a Curtiss SDOC Seagull from the cruiser USS *Philadelphia* not sighted a group of thirty-five German tanks concealed in a thicket adjacent to Red Beach. The

For a time, the Royal Navy used the Supermarine Walrus as a fleet spotter, but it was too slow and vulnerable. Peter Coles



cruiser laid down a heavy barrage on this location; seven tanks were destroyed and the remainder withdrew.

Four Austers of No 654 Squadron disembarked in three-ton lorries and were assembled on a landing ground 150 yards from the beach, being ready for operations by 0900 on D+1. By D+7 the whole squadron was deployed, with 'A' Flight in support of 46th Division, 'C' Flight in support of 56th Division, and 'B' Flight in support of 7th Armoured Division, which was being held in reserve. Two pilots were assigned to observe naval gunfire, and one of them, Captain Peter Newman, spotted for the guns of the USS *Philadelphia*, which destroyed a factory near the town of Battipaglia, where German armour was massing for an attack on a US Ranger Group. The attack did not materialize, and Allied patrols who penetrated into the factory are later reported having found 'mountains of enemy dead'. Unfortunately, Newman was killed some time later, when his aircraft hit a tree and crashed in flames as he was directing a shoot.

Between 9 September and 31 December 1943 No 654 Squadron flew some 500 operational sorties. To quote *Unarmed into Battle* (Parham and Belfield), these included:

'The spotting of flak positions during close support bombing attacks, and the engagement of these positions later; the reconnaissance of Division and Regimental gun areas, roads and tracks; the taking up of Infantry and other Commanders to see the actual ground over which they were to operate; information sorties to confirm the positions of our own troops and of the enemy; the taking up of Artillery pilots to show them the Corps front prior to their being briefed; the supplying of information about landing grounds to the RAF communication flights; the carrying of maps and operational orders to outlying formations; the transmission of a 'running commentary' by R/T direct to Corps HQ on the progress of an operation as seen from the air; the collection of air photographs, the night observation of fire, and the observation of smoke screens and their adjustment for position and density.'

In December 1943 a third RAF Air OP squadron, No 655, arrived in Italy. This unit had formed at Old Sarum on 8 December 1942 under the command of Major E.B. Ballard, RA; initially equipped with Auster Mk Is, it received Mk IIIs in the spring of 1943. Major Ballard was killed in a flying accident in April, and the squadron came under the temporary command of Captain P.G. Illingworth until it was taken over by Major D.P.D. Oldman in May. In August 1943 the squadron sailed for North Africa and in December its Austers flew to Italy via Cape Bon, Pantellaria and Sicily, with a Catalina flying boat leading the way. The unit established itself at a landing ground south of the River Sangro and went into action amid muddy, mountainous terrain near Ortogna. The weather conditions were terrible, and some pilots had lucky escapes, none more so than Captain G.M.H. Aitcheson of 'C' Flight, sent out to look for formations of troops which were making their way from the centre of Italy to the Sangro area.

Since snow had blocked most of the routes the pilot...was briefed first to find a clear route for these formations and then to drop a message on them telling them the route to follow. Aitchison, who disappeared for three days and had been given up for lost, returned to tell the following tale. He had set off in fairly good weather but it soon deteriorated as his course took him up a narrow valley with high mountains on either side. It then began to snow and the visibility grew rapidly worse; it was also extremely bumpy. He suddenly noticed that the Air Speed Indicator was showing a tremendous speed (for an Auster) and thinking he must be diving Aitchison pulled the stick back only to find that the speed was further increasing. He realized in a flash he must be upside-down, and though he had no idea of his height, he decided to attempt a blind flying half-roll, which fortunately came off. As the aircraft was coming out of the roll Aitchison saw trees just beneath him, but it was too late to do anything and he crashed into them; the machine was completely wrecked but miraculously Aitchison himself escaped unhurt. When he had recovered from the shock he looked around and saw nearby a partly ruined cottage. He went into it, tore up some floor boards, and lit a fire. His position seemed to him pretty hopeless, not only was he completely lost in the mountains but he had no food. After resting for a time he went out to have another look at the aircraft. He discovered that the compass was undamaged, and using it he set out walking south. A few hours later he ran into a friendly patrol which was also lost, and after two days' walking they reached the Allied lines.'

On 22 January, 1944, the Allies landed at Anzio and Nettuno on the west coast of Italy, a move designed to outflank the Germans' strongly fortified defensive position known as the Gustav Line. Between that date and 15 February the Allied air forces dropped 12,500 tons of bombs on enemy airfields and communications, but this did not prevent the Germans from counter-attacking in strength, their counter-offensive being supported by the Focke-Wulf Fw 190G-1s of I and II/*Schlachtgeschwader* 4. It was contained with the help of strong Allied air support and naval gunfire, but the invasion force at Anzio was unable to break out. 'A' Flight of No 655 Squadron was quickly deployed to Anzio in the wake of the initial landings, and during the weeks that followed its pilots conducted most of the naval shoots, as well as supporting the 1st Infantry Division's artillery. In the first month of its deployment 'A' Flight, with only five pilots, flew 244 sorties and conducted 108 shoots; it was later joined by 'C' Flight, which had been operating on the east coast. Enemy fighters were troublesome. Captains P.B. Dutton and A.G. Dick were shot down and killed, and six others evaded their attackers.

During the Anzio landings, US Piper L-4s operated from the decks of LSTs (Landing Ships Tank) to support artillery in the beachhead. This technique had been pioneered during the Sicily landings by Captain Brenton Devol, Jr. The American pilots had some interesting encounters during their operations in Italy. On one occasion, Lieutenant Alfred Schulz was attacked by a Bf 109,

whose pilot made the mistake of trying to match the L-4's evasive manoeuvres and flew into the ground; on another, Lieutenant Duane Francis found himself engaged in a dogfight with a Fieseler Storch, both crews firing at one another with small arms. Francis succeeded in shooting down the Storch, whose crew was taken prisoner.

All the Air OP units in Italy, American and British alike, experienced some very hard fighting during 1944. No 651 Squadron's war diary records that its landing grounds came under frequent shellfire, and it was not uncommon for individual pilots to register up to nineteen targets in the course of a day's operations. In March 1944 No 651 Squadron was relieved by No 657, which reached Italy from North Africa with its Auster IIIs on the 20th. No 651 Squadron re-equipped with Auster IVs in May and 657 followed suit in June. In August 1944 a fourth AOP Squadron was formed in Italy; this was No 663, which was under Polish control and manned by Polish personnel. Like the others, it was equipped with Auster IVs.

Nos 651, 654 and 657 Squadrons all operated in support of the Allied assault on the German Gothic Line, the last enemy defensive line north of Florence that blocked the advance northwards into Austria. The line was breached in September 1944, the Fifth Army in the west reaching Bologna on 23 October and the Eighth Army in the east attacking north and west before digging in for the winter. During this final phase of the war in Italy the Air OP pilots co-operated with Allied fighter-bombers seeking out enemy tanks and self-propelled guns on the Lombardy Plain.

In the winter of 1944-45 detachments of the British Air OP squadrons in Italy were sent to Yugoslavia and Greece to support Allied task forces operating with partisans. It was not a happy experience, especially in Yugoslavia, where the Austers, despite having large red stars painted on them, were often fired on by partisans. The aircraft were recalled early in the New Year.

When the Allied tactical air offensive re-opened in northern Italy in 1945, priority was given to the disruption of rail communications between Italy and Austria, the only supply route that was now open to the enemy. In January, 1725 tons of bombs were dropped on the road and rail approaches to the Brenner Pass, which were completely dislocated, and marshalling yards in both Austria and northern Italy were also hard hit. By the middle of March, the German forces in Italy were virtually isolated. The last offensive of the Italian campaign was launched in April 1945 against sixteen German and one Italian fascist divisions on the Appenine-Senio line, being preceded by a massive air attack and an equally devastating artillery barrage, which was lifted for four-minute intervals to allow fighter-bombers to attack strongpoints. On 10 April, when the Eighth Army launched its assault, the line began to crumble, and by 21 April, after the Fifth Army had also attacked in the centre, it was completely broken.

There was no stopping the relentless advance of the Allied armies now; the remaining objectives fell in rapid succession, and on 24 April German

representatives signed the instrument of unconditional surrender. The ceasefire would not officially take effect until 2 May, but to all intents and purposes the war in the Mediterranean Theatre was over.

By this time No 657 Squadron had left the theatre, having been redeployed to Gilze-Rijen in Holland via Marseille in April.

Of the other British AOP units in the theatre, No 651 Squadron ended its war at Klagenfurt in Austria, being redeployed to Egypt in November 1945 and then to Palestine. No 654 Squadron remained in Italy until June 1947, when it disbanded; and No 655 disbanded in Italy in August 1945. No 663 Squadron returned to the United Kingdom in October 1946, where it disbanded.

FROM NORMANDY TO THE BALTIC:

AIR OP IN NORTHWEST EUROPE, 1944-45

In March 1943, the Home Forces in Britain conducted a large-scale manoeuvre called Exercise *Spartan*. The assumptions for this exercise were that Allied forces had gained marked air superiority, established a bridgehead on enemy territory, captured a number of airfields and were now preparing a further advance. It drew on all the lessons of the war in North Africa and of the abortive 'reconnaissance in force' at Dieppe in August 1942, and was in fact a dress rehearsal for the liberation of Northwest Europe.

A detailed report on Exercise *Spartan* was drawn up by Air Marshal Sir Arthur Barratt, the Air Officer Commanding-in-Chief (AOC-in-C) of RAF Army Co-operation Command. Barratt had recently visited North Africa to see at first hand the effects of tactical air power (and it should be remembered that he had already been on the receiving end of it during the Battle of France), and his findings confirmed the necessity for a 'composite' air force with a broader conception of air support in which the fighter, the fighter-bomber, the fighter-reconnaissance aircraft, the light bomber and the heavy bomber were all harnessed for army support.

Already, on 10 March, it had been decided that a so-called 'Composite Group' designated to give air support to the land forces in a cross-Channel invasion should be named a Tactical Air Force - as in Tunisia - and that this was to be formed within the framework of Fighter Command. This force would consist of No 2 Group (light bombers, transferred from Bomber Command); No 83 Composite Group (fighters, fighter-bombers and fighter-reconnaissance aircraft, already part of Fighter Command, No 84 Group (not yet formed); No 38 Airborne Wing, transferred from Army Co-operation Command; and No 145 Photo-Reconnaissance Wing.

On 1 June 1943, Army Co-operation Command ceased to exist with the formation of the Tactical Air Force (later to be renamed 2nd Tactical Air Force). On 10 June Air Vice-Marshal J.H. D'Albiac was appointed AOC, Tactical Air Force, and in August Air Marshal Trafford Leigh-Mallory was appointed Commander-in-Chief of the as yet non-existent Allied Expeditionary Air Force. There was little doubt that he was the right man for the job. In 1927 he had been Commandant of the School of Army Co-operation at Old Sarum, and had remained a staunch advocate of army co-operation principles - to the detriment, perhaps, of his own career - when the



A Mustang Mk I of No 26 Squadron, which carried out tactical reconnaissance over Normandy. Air Marshal Sir Frederick Sowerby

higher echelons of the Air Staff were in vehement opposition to them. A controversial figure during his command of No 12 Group Fighter Command in the Battle of Britain, disliked by many, it was nevertheless Leigh-Mallory who would lay the foundations of the massive tactical air superiority that would be enjoyed by the Allies during Operation *Overlord*, the invasion of Europe, in the following year.

The RAF Air OP squadrons earmarked to support the invasion were No 652 (Major R.R. Cobley); No 653 (Major T.I. Tetley-Jones); No 658 (Major A. Lyell); No 659 (Major E.D.V. Prendergast); No 660 (Major F.N. Lane); No 661 (Major P.H. Dowse); and No 662 (Major G.A. Hill). The intention was that small reconnaissance parties from the first Air OP squadrons scheduled to fly to France would select suitable landing strips on D-Day, and that the Austers would cross over on D + 1 and D + 2, the aircraft flying in formations led by Supermarine Walrus amphibians of the Royal Navy to avoid any unfortunate navigational errors on the 60 mile sea crossing.

The American L-4s, whose endurance was less than that of the Auster, were mostly to be shipped to France on LSTs, although it was planned to fit some of them with an extra fuel tank, installed in the rear seat area, so that they could make the crossing direct.

Until artillery could be established ashore, the invasion force would have to rely on naval gunfire for support, and to direct this an Air Spotting Pool was established at Lee-on-Solent in Hampshire, comprising Nos 26 and 63 Squadrons RAF and US Navy Squadron VCS-7 with Spitfire Vs, and Nos 808, 885, 886 and 897 Squadrons of the Fleet Air Arm with Seafire IIIs, as part of No 34 Reconnaissance Wing, 2nd Tactical Air Force. As D-Day approached, three squadrons of RAF Mustang tactical reconnaissance aircraft (Nos 2, 268 and 264) were added to the strength of the wing, which already stood at 101 Spitfires and Seafires.

No 34 Wing was brought to readiness on 3 June 1944 and the first pair of

Seafires took off at 04.30 on D-Day, 6 June to seek likely naval gunnery targets, one pilot acting as spotter and the other acting as escort. The usual altitude for spotting missions was 6000ft, but poor weather often forced the spotter to operate between 1500ft and 2000ft. With the three Mustang squadrons contributing ninety-six sorties the mission total for the day came to 435. Losses were three Seafires, three Spitfires and a Mustang.

The normal equipment of the US Navy observation squadrons was the Curtiss S03C Seagull, but experience in the Mediterranean theatre had shown that these aircraft were very vulnerable to attacks by aircraft like the Messerschmitt 109 and Focke-Wulf 190. In the Mediterranean, many naval observation pilots were trained to fly the Curtiss P-40 Warhawk and the North American P-51 Mustang, which stood a far better chance of survival. In England, probably because P-51s were in great demand as bomber escorts, it was decided to train seventeen cruiser and battleship observation pilots from the battleships *Nevada*, *Arkansas* and *Texas* and the cruisers *Quincy*, *Tuscaloosa* and *Augusta* to fly the Spitfire Mk Vb. Training was undertaken by the 67th Tactical Reconnaissance Group at Middle Wallop, which had been taken over by the US IX Fighter Command in August 1943. VCS-7 was specially formed for the air spotting task. Its first CO, who assumed command on 8 May 1944, was Lieutenant Robert W. Calland, senior aviator on the USS *Nevada*. He was relieved by Lieutenant-Commander William Denton, Jr., senior aviator on the USS *Quincy*, on 28 May, the day the squadron became fully operational and moved to Lee-on-Solent.

The clocking, or ship control, method was utilized on the majority of spotting sorties; in this, a single warship acted as master controller for a group of others, directing fire on to a single target. Occasionally, missions were flown at very low altitudes, especially in bad weather conditions. Drop tanks were used to increase range. A typical spotting sortie lasted close to two hours; this provided 45 minutes on station and one hour in transit. The *Luftwaffe* was rarely encountered, although several of Lee-on-Solent's aircraft were shot down by German fighters. Four VCS-7 pilots were attacked by Bf 109s and Fw 190s, but the Spitfire's excellent manoeuvrability saved them and all four returned safely. Flak, however, was common and accounted for the squadron's only loss, Lieutenant Richard M. Barclay, senior aviator aboard *Tuscaloosa*. Lt. Barclay's wingman, Lieutenant (jg) Charles S. Zinn, also from *Tuscaloosa*, managed to return home despite severe damage to his right wing and aileron.

Attacks on aircraft of the Air Spotting Pool were fairly frequent during the first week of the invasion, the enemy fighters breaking through the top cover of RAF Spitfires and USAAF P-47s. On 7 June, Lieutenant-Commander S.L. Devonald RN had to ditch alongside an LST, while Lee-on-Solent's Commander Flying, Commander J.H. Keene-Miller, RNVR, became a prisoner of war after being attacked by six Bf 109Gs. A Spitfire V of No 268 Squadron was also hit by flak while spotting.

From 15 June, as artillery built up within the beachhead, there were fewer calls on the Spotting Pool's services. Following the bombardment of

Cherbourg on 26 June, naval gunfire support operations ceased, the fighting having moved inland out of the range of the ships' big guns. VCS-7 was disbanded, and all personnel returned to their ships. During twenty days of combat operations, the aviators of VCS-7 were awarded nine Distinguished Flying Crosses, six Air Medals and five Gold Stars. Ten VCS-7 aviators went on to participate in the invasion of southern France and three others took part in the invasions of Iwo Jima and Okinawa in the Pacific during 1945.

One of the first Air OP pilots to see action during the invasion was Major J. Elmore Swenson, who flew his L-4 across the channel on D-Day and conducted one of the first fire missions on Omaha Beach, where US troops were pinned down and sustaining heavy casualties. Of the RAF Air OP squadrons, the reconnaissance parties of Nos 652 and 662 were first across and were soon followed by their aircraft, 'A' Flight of 652 Squadron flying into Béný-sur-Mer and No 662 Squadron deploying to Le Hamel within forty-eight hours. Captain Eric Pugh of 'A' Flight, 652 Squadron, was an early casualty, being shot down by Fw 190s on 8 June.

On 14 June Major Prendergast's 659 Squadron deployed to Normandy in support of VIII Corps, which was to spearhead Montgomery's attempt to bypass Caen. It lost several aircraft due to accidents and enemy action, and one of its pilots, Captain P.I.D. Heard, was shot down and killed by Bf 109s. On 18 June Major Andrew Lyell's 658 Squadron arrived to support XXX Corps. After a period of restricted operations due to poor weather, this squadron was very active in July, and registered some spectacular successes. Enemy fighters continued to be troublesome, as Major Lyell records in his book *Memoirs of an Air Observation Post Officer*:

On the 8th of July, during the Caen battle, I did a number of counter battery sorties, but found that there was not much that I could do other than watch. I saw a massive German artillery concentration falling among our own massed tanks, though very few of the tanks appeared to me to have been actually hit. I kept just below a large dark cloud and had LAC Wadhams with me as observer. An enemy fighter made two passes at us but Wadhams gave me adequate warning and I was able to disappear into cloud cover. At one time our tanks were held up by a line of German 88mm guns which had a dual anti-aircraft and anti-tank role. I tried to locate these guns but they were too well hidden in the smoke of battle.

On the 10th of July, our troops occupied Caen and the Battle of the Orne to the west of Caen began. This kept us busy, particularly at dawn and after dusk when enemy artillery flashes were visible. I did a number of shoots which I described in my log book as "neutralization of enemy mortars seen firing". On the 12th of July I was asked to locate thirty enemy tanks which had been seen in the neighbourhood of St Martin but I reported that what had been seen were only bushes. In this I think I was mistaken.

'At 0200 hours the Flight which I had formed out of the pilots of my



Captain Raymond Coles with his Auster III Coming My Way? Coles was awarded the DFC after his encounter with the enemy fighters. Peter Coles

Squadron HQ came under command of 3 AGRA [a group of artillery regiments - author] and at 0530 hrs the ground station and aircraft were netted to the 3 AGRA frequency.

At 1110 hrs Jimmy Magrath carried out an "M Target" (a target fired on by an artillery regiment) on an enemy battery (13th Medium Regt), and at 1140 hrs he carried out an M Target on two enemy self-propelled guns seen firing with the same regiment. At 1550 hrs I carried out an M Target neutralizing four enemy mortars seen firing with the same regiment.

At 1705 hrs Jimmy carried out a destruction shoot on the church tower at Feuguerolles-sur-Orne at the request of the infantry who said that the enemy were using this tower as an observation post. He scored nine direct hits but the tower was seen still standing afterwards. Presumably the enemy had given up using it as an OP.

At 2010 hrs Jimmy carried out a "Yoke Target" (a target fired on by an AGRA) on a hostile battery and shortly afterwards he reported to 3 AGRA map spottings of two other HBs which were active.

On the 14th of July we provided continuous Auster cover with two aircraft from 0530 hrs to 2200 hrs. Jimmy Magrath located an active enemy heavy battery and engaged it heavily with 59th Medium Regiment as a regimental target.

Coles (Lieutenant R.G. Coles of 653 Squadron) successfully evaded a single attack from a number of Me 109s, four of which were shot down over our own lines by flak [in fact, Coles' log book states that he was attacked by Fw 190s - author]. Enemy fighters were then doing a 'milk round' daily between 1300 hrs and 1430 hrs and again just after dusk. I wrote in our War Diary, 'We will endeavour to keep out of the air between these times', but of course this was not in fact practicable.

Coles had his aircraft peppered with holes when flying at 50ft by six



The River Orne, where the British 6th Airborne Division secured a vital bridgehead on 6 June 1944. Peter Coles



enemy mortar bombs bursting directly beneath him. Pilots were then told not to go below 200ft when flying near the front line owing to the danger of blast and splinters from shells etc bursting beneath them. I wrote in our War Diary that day, 'The maximum AOP height of 600ft has gone by the board: the cloud base and the pilot's discretion are now the only limits. Captain Magrath's shoot of today was observed at 2100 hrs at a distance of 15,000 yards from a height of 4500ft. It was interrupted once for five minutes only by the appearance of fighter-bombers who were however discouraged by our flak from delaying their more urgent journey to bomb the beaches.

Enemy armour was a primary target for the spotter pilots, and on 17 July Major Lyell conducted a massive shoot involving some 500 guns of the 2nd, 12th and 30th Corps, with their supporting Royal Artillery groups, on forty tanks of the 10th SS Panzer Division, destroying many of them. It was probably the biggest 'battery' ever directly controlled by one man, certainly the pilot of a light aircraft.

The American Air OP pilots, meanwhile, had been very active in their own sectors, as the War Diary of the 14th Armored Field Artillery Battalion (compiled by the Battalion Commander) records:

June 14: marked the entry into combat of our air OPs. These had been on the Division Artillery airstrip since they flew across the channels in formation, guided by an Air Force airplane. Since there had been fairly low clouds the day of the movement to Carentan, somebody at the division artillery airstrip decided our planes could not join us. This was one of the characteristic mistakes which occurs when the airplanes are under the control of someone other than the man who is going to use them.

If the airplanes had been with us for the second attack on the afternoon of the thirteenth, it might have been possible to have detected any rearward movement of the enemy after he had felt the full force of the attack. On the fourteenth the air observers had fine shooting, especially since the Germans were not yet accustomed to seeing the airplanes in the air, and measuring their effectiveness by the artillery fire which fell upon them when they exposed themselves. At any rate, from this time on I struggled to have my airplanes with me, although not always with success...

June 17: The air OPs had proven their effectiveness and their ability to observe counter-battery fire, as well as to detect other targets in the Bocage country...

July 1-18: (Caumont) Our air OPs were again proving their worth. The air sections located their landing strip perhaps a mile in rear of the command post. Because of the conformation of the front, however, (we occupied the front left-hand corner of a sharp salient) they were not very far from the enemy. In spite of low approaches which they made to the

landing field, they were occasionally shelled. On one occasion, Lieutenant Fein and Sergeant Pechar, becoming irritated at this discourtesy, took off under shell fire and did some fine shooting back. The good which the airplanes did was not limited to the negative benefit of holding down hostile fire. Again and again they proved their worth in locating hostile guns. At dusk, this was especially easy since the flashes of the guns were very distinct...

July 4: I flew an air mission over the front to check on the work of the observers. After seeing the enemy side of the lines from the air, I tended to put more faith than ever in the air OPs. They were really looking right down the enemy's throat. No big movement could have taken place close to the enemy lines in the daytime without it being detected from the air. After repeated missions over the same front, the observers became so familiar with the front that adjustments on targets were frequently unnecessary. They could tell the coordinates with remarkable exactness...

July 26- August 1: (Tessy-Sur-Vire) The air OPs in this fight gave us about the only real observed fire we had. The forward observers were hemmed in by the trees and hedgerows and could not see beyond their immediate front. The German artillery was behind the ridge and with observation all along the line of our attack. The air observers did a fine job, in spite of almost constant sniping at them by 88mm anti-aircraft guns.

On one occasion, we managed to save General Rose, who was pinned down by artillery fire, by the efforts of Lieutenant Fein and Sergeant Pechar. Toward dusk on this day, they were having wonderful shooting at the hostile artillery, but they reported they were about out of gasoline, and would have to come down. Of course, I told them to stay up and keep up the shooting. Finally, it got too dark for them to see, and they headed for the airstrip. They ran out of gasoline on their final approach, and had to make a night forced landing.

During part of the battle, Captain Dyson was acting as observer with the 1st Battalion, 66th. He switched his radio to the battalion air channel, and by talking back and forth with the air observer, managed to get effective fire on his front. As far as I know, this was the first time this obvious and effective coordination between the air OPs and forward observers was used. It was an excellent scheme.

It had the disadvantage of focusing the attention of the air observer on this small part of the front to the exclusion of the others. It worked out so well that we soon started the same system with all our observers, under the control of the S-3, to prevent one observer from hogging all of the observation...'

In the American observation squadrons, the Piper L-4 Grasshoppers had now



Almost anywhere will do! These photographs show typical advanced landing grounds (ALGs) during the Normandy campaign, with swathes cut through the corn to make runways. Peter Coles

been joined by some Stinson L-5 Sentinels. The L-5 was the military version of the commercial Stinson 105 Voyager, six examples of which were purchased by the AAF in 1941 as YO-54s for testing. Quantity orders for Sentinels were placed in 1942, first as O-62s before the designation was changed to 'L' for liaison in April 1942. Between 1942 and 1945 the AAF ordered 3590 L-5s, making it the second most widely used AAF liaison aircraft. The unarmed L-5 with its short field take-off and landing capability was used for reconnaissance, removing litter patients from front line areas, delivering supplies to isolated units, laying communications wire, spotting enemy targets for attack aircraft and artillery, transporting personnel, rescuing Allied personnel in remote areas and even, on occasions, as a light bomber. It was the L-4, however, that remained the principal observation type.

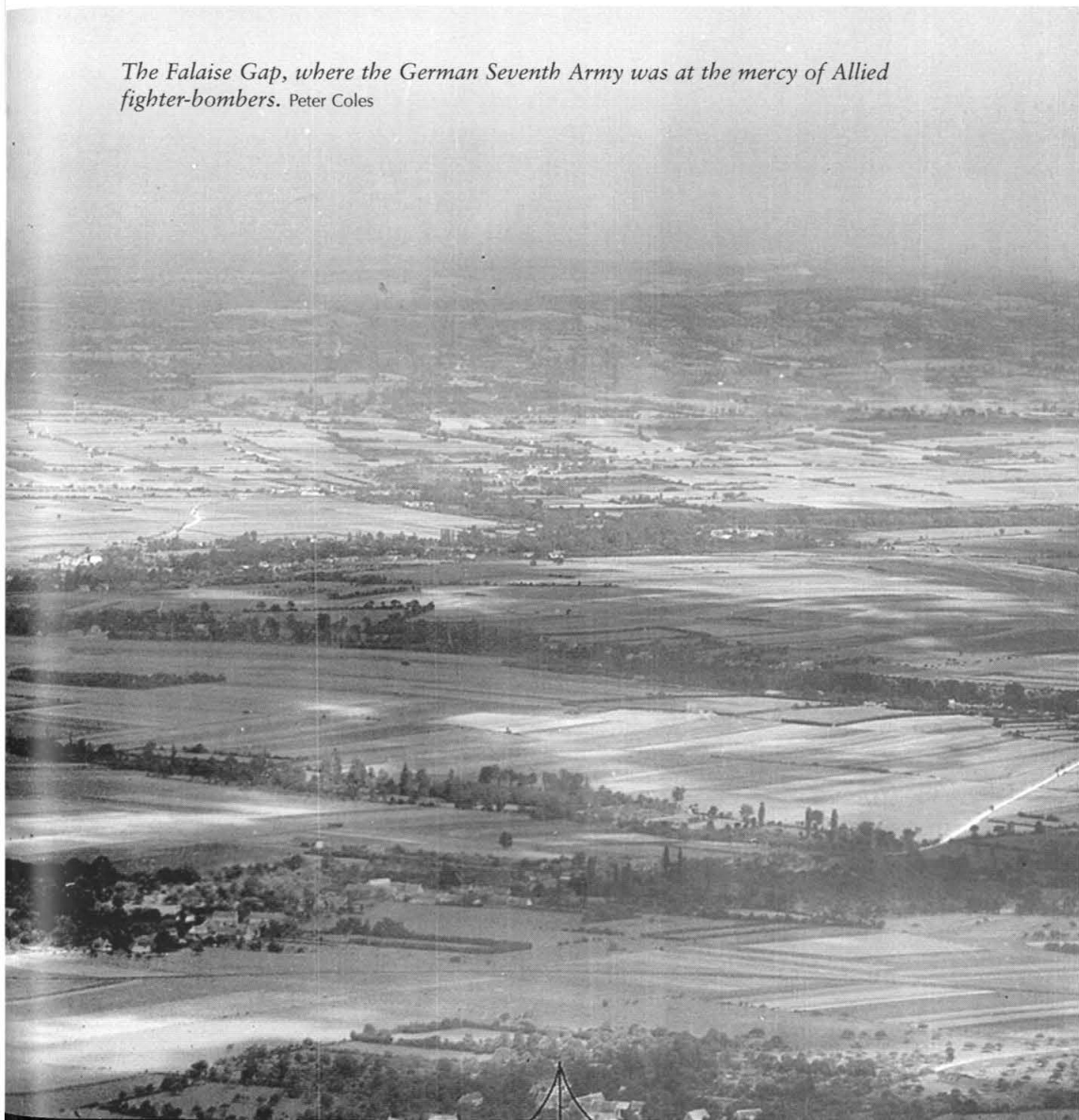


The town of Falaise, almost obliterated by artillery bombardment and air attack.
Peter Coles

By the end of July 1944 all the RAF observation squadrons were deployed to France, Major F.N. Lane's No 660 Squadron having arrived at Courselles on Juno Beach on the 9th and Major P.H. Dowse's 661 Squadron crossing the Channel on the 21st. Caen fell on 8 July and General Patton's US armoured forces took St Lo on the 18th, precipitating the breakout from Normandy. The First Canadian Army attacked south-east from Caen to Falaise, where the observation squadrons flew intensively as the Allied air and ground forces embarked on the destruction of the German Seventh Army, trapped in the Falaise gap. The diary of 'B' Flight, 653 Squadron, says of 18 August:

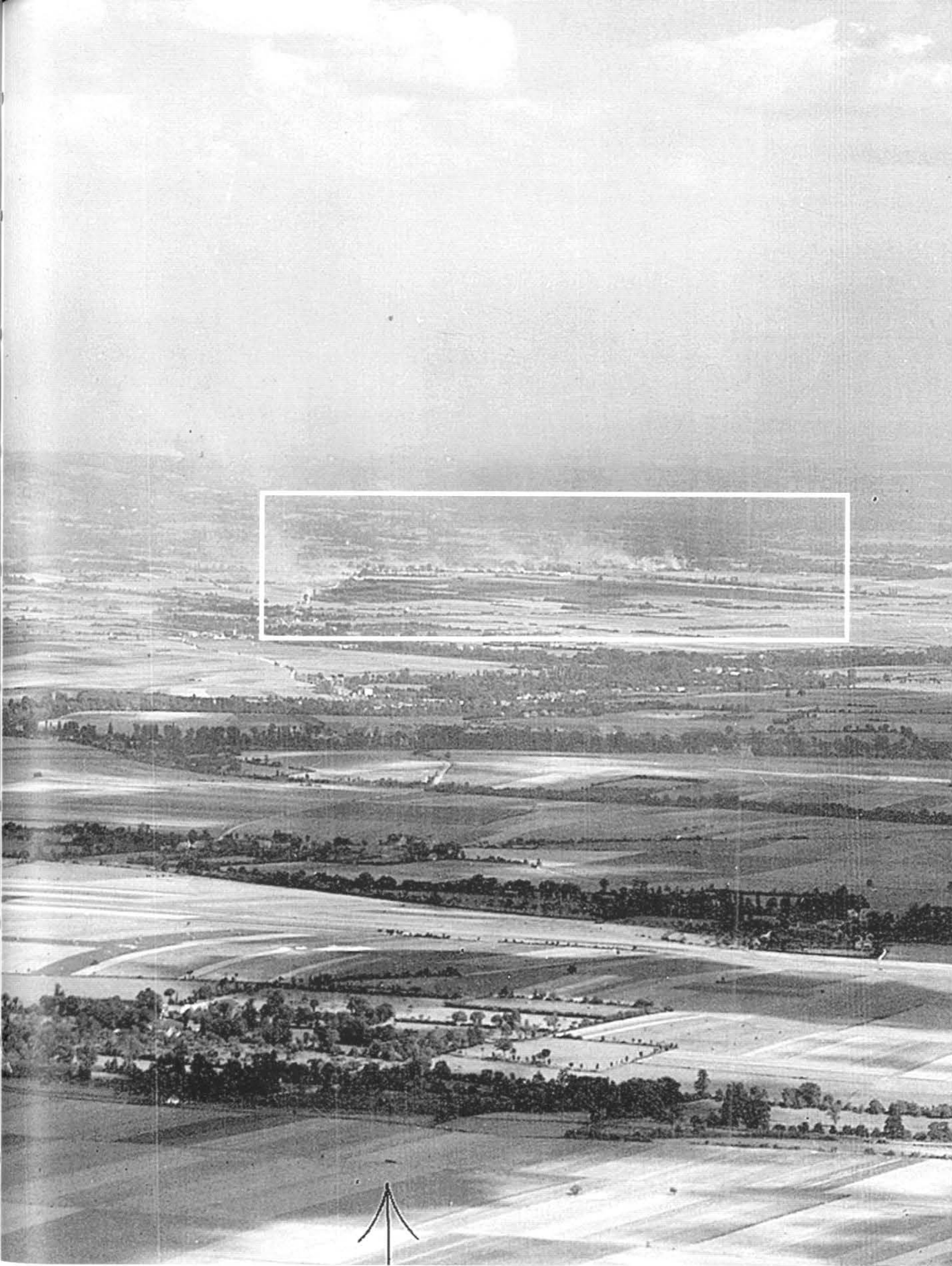
An epic day. The gap practically closed and enormous slaughter of enemy tanks, MT and infantry carried out by the Div...The whole area filled with movement. 'B' Flight occupied new landing ground at 0830 hours, and carried out almost continuous sorties all day. Coles, with 4

The Falaise Gap, where the German Seventh Army was at the mercy of Allied fighter-bombers. Peter Coles





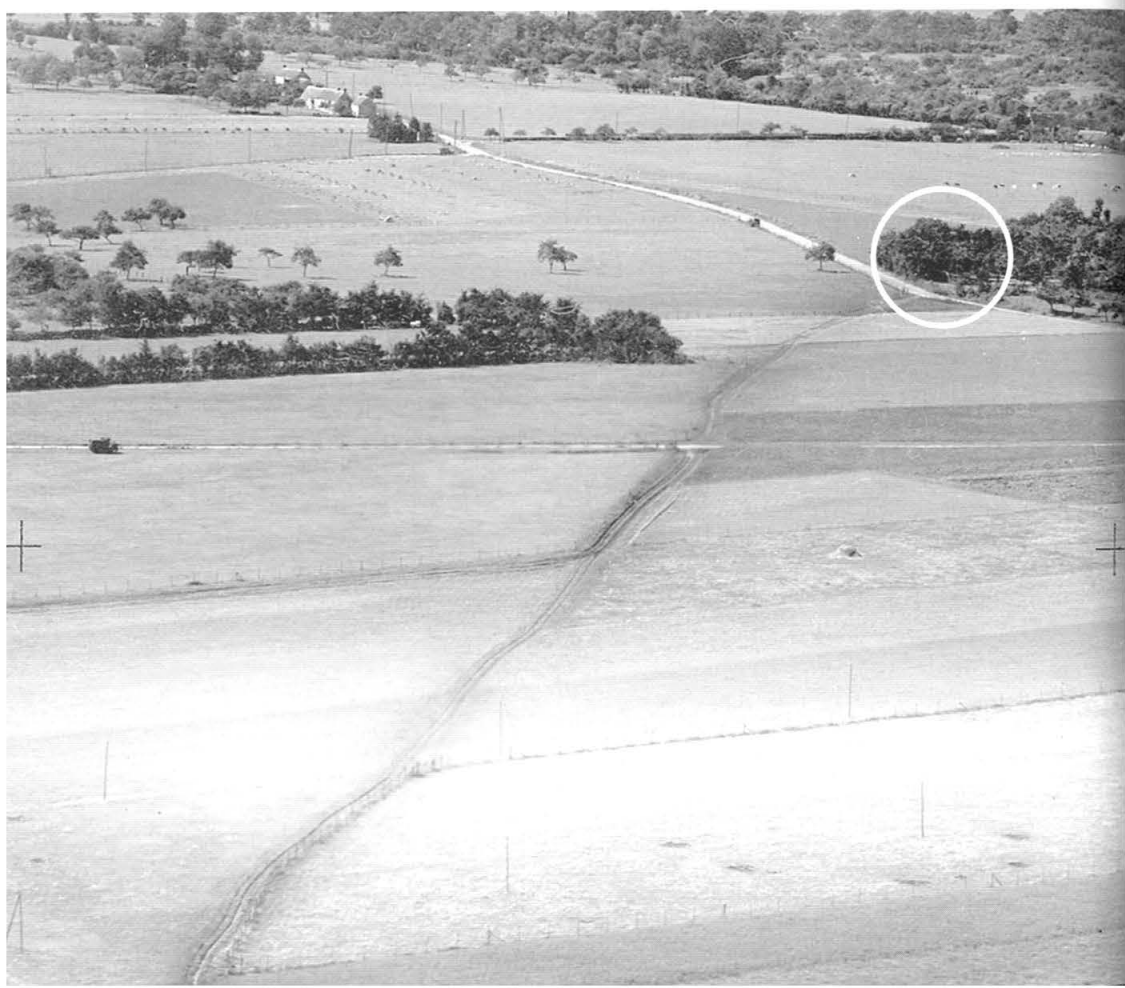
Enemy transport under attack in the Falaise Gap. Peter Coles





Enemy transport destroyed in the gap. Peter Coles

Nowhere to hide. Tracks through the corn point to where a German tank has sought refuge in a copse. Peter Coles





Tracks mark the course of the battle for Hill 112 in Normandy. During the breakout battles of Normandy, the Battle for Hill 112 was viewed as critical to both the British attackers and German defenders. As a result Hill 112 has often been called the 'Verdun of Normandy'. It was here that the British breakout came to a halt, following the crossing of the Odon, and the fighting around the high ground of the infamous Hill absorbed several British formations during the summer of 1944. During two days fighting alone, 10-11 July 1944, the 43rd (Wessex) Division suffered more than 2000 casualties, and the slopes of the Hill were ablaze with the wrecks of British tanks (largely Churchills) knocked out by the SS Panzer units in occupation of the high ground. Hill 112 was not finally cleared until 3 August, during the final phase of the breakout from Normandy.

RHA, who were supporting the tanks, flew six hours forty minutes and did twelve shoots from Battery to Divisional Targets. His grand total was six Mike (ie Regimental) targets, five Uncle (ie Divisional artillery) targets and one Battery target. All on tanks or MT columns...By evening the whole area was littered with fires from burning vehicles, tanks and woods.

The Germans were now in full retreat across the Seine towards Belgium and Luxembourg, and targets of unparalleled opportunity presented themselves, but not always to good advantage, as the diary of the US 14th Armored Field Artillery Battalion records:

August 26: (Seine) A massed group of about 400 German vehicles was detected by Lieutenant Moyer from an air OP. They were hub to hub, waiting their turn to be ferried over the river. Moyer begged, prayed, cursed, and screamed through the whole gamut of the fire request lexicon. It didn't do any good since they were out of our range and in the Canadian sector besides. We had to tell Moyer to come down to keep him from having an apoplexy...

September 1: (Belgium) The 14th Field Artillery supported that attack on this column, and all of the while there was a hue and cry, 'Where are the Cubs?' There was a high wind on the ground, and above the tree tops the velocity must have reached 60 miles per hour. The air OPs were valiantly struggling (against the wind) to get into the fight, when one of them discovered what he estimated as a battalion of German infantry attempting to escape to the north-east. The 14th swung around and took this new target under fire. The Germans were caught in the open, and suffered terrible losses under this accurately directed fire...

The speed of the Allied advance was also causing problems as the supply train strove to keep up:

(Belgium) Again on the 7th we had to wait for gasoline. The Reconnaissance Battalion, however, had patrols out as far as 20 miles to our front. The division artillery air OPs were working with these patrols. Captain Mahon as observer and Sergeant Welsh as pilot on this work had an experience which changed rapidly from fun to ludicrousness. They were working with an armoured car section when they discovered about a company of enemy infantry attempting to seek cover in a woods. Mahon radioed this information to the armoured cars, who immediately started forward to round up the catch. It became apparent to Mahon that the Germans would escape into the woods, and probably for good, unless they were delayed.

He therefore staged a strafing attack, firing at the troops on the ground with his submachine gun, and even dropping hand grenades in their midst. This was fun and very exciting, and the Germans stopped at each pass to hit the ground or to fire back. On one pass, however, somebody, either Mahon or the Germans, shot the propeller off the Cub,

and the situation rapidly deteriorated out of the realm of strategic air warfare. The only field available for the forced landing was the one which the Germans were dominating through occupation. Welsh made the landing. Just as the Germans were descending upon them in order to exact their pound of flesh, the armoured cars arrived and saved the day for the Allied nations...'

The American Air OP pilots were becoming adept at providing their little aircraft with a fighting capability. The carriage of submachine guns was routine, and a method was devised where bazooka rocket launchers could be attached to the Cub's wing struts. The pilot could fire them by reaching out of the window and pulling a lanyard. L-4 pilots supporting the 4th Armored Division in its drive through North West Europe reported some success with this arrangement.

While the British XXX Corps pushed forward into Belgium, supported by Nos 658 and 662 Squadrons, other Corps of 21st Army Group were held back because of a shortage of supplies, and their AOP squadrons remained with them. For these squadrons, the autumn of 1944 was remarkable only for a round of liaison duty, ferrying officers from place to place or collecting and delivering items such as maps and despatches.

Nos 658 and 662 Squadrons, by contrast, were in the thick of the fighting, as Major Hill, commanding 662 Squadron, later described:

The Guards Armoured Division had arrived in Brussels on the Sunday night, together with our 'B' Flight who had parked themselves in the western outskirts of the town. Corps came along early next morning (shouting for a landing ground as quickly as possible) and established themselves in the Palace grounds on the eastern outskirts of Brussels. To find an ALG in Brussels was impossible. Immediately outside, however, on the eastern edge of the town, was Brussels civil airport about which we knew nothing, but we imagined it must be all clear of the enemy. The CO flew forward to the airport gingerly to have a 'look-see'. All was quiet and not a sign of anyone. He flew up and down the grass looking for mines and, seeing none, selected a suitable piece of ground and then flew back to the previous strip dropping a message on Corps on the way, saying the airport was OK and he was going to use that.

On arriving back he ordered the four aircraft up and himself got in a car and went back via Corps to the airport. As he arrived at the airport the four Austers appeared over the Brussels housetops. They put their flaps down and then suddenly the fun started. A battery of 88mm German guns opened up; they were exactly 1100 yards from the edge of the aerodrome and had been lying 'doggo'. The aircraft, ignoring all danger of mines, landed and taxied like maniacs until they had got behind the derelict hangars. Only one aircraft was hit - a miracle. The situation was now that behind two very seedy looking hangars were four aircraft, four pilots, and the CO in a Jeep. A battery of 88s was firing over open sights at us and was being very unpleasant indeed. An

undamaged aerodrome is worth its weight in gold but we had no guns that we could call on for an hour or two. At this moment small arms fire broke out from the buildings on the far side of the aerodrome. The Squadron HQ transport had arrived in from the Brussels entrance and were being greeted by a hail of fire. We had to get some help as quickly as possible, both to save our skins and the airport. A message (couched in rather excited terms) to Corps produced the answer – sixteen armoured cars and a company of Guards. By nightfall the guns had been captured and all was well. Our casualties were one aircraft, eleven damaged but serviceable trucks and no personnel hit. We had gained an aerodrome which could take anything at once. We stayed at Brussels for about a week. When we left to go on, Dakotas were coming at the rate of forty an hour and a Wing of Spitfires was operating from the aerodrome. It was very gratifying.

In September 1944, while Nos 660 and 661 Squadrons flew in support of the Canadian First Army's thrust up the Channel coast through the Netherlands towards the vital port of Antwerp, Nos 653, 658 and 662 supported the northward dash of Lieutenant-General Brian Horrocks's XXX Corps from the Belgian border to Arnhem, the intention being for the Guards Armoured Division to link up with US airborne forces at Grave and Eindhoven, push on to relieve the British 1st Airborne Division at Arnhem, and drive through to the Zuyder Zee.

Major Lyall's 658 Squadron operated a very efficient courier service during this operation, carrying messages between Nijmegen (where Lieutenant-General Frederick Browning, Commanding First British Airborne Corps, had his HQ) and various other headquarters, including Field Marshal Montgomery's. The task was not without its dangers, as Lyall explains:

'...Charles McCorry of 'B' Flight was flying a Major Hazell from Nijmegen to Tac Army with an urgent message that supplies that had been badly needed by our troops at Arnhem had been dropped into German hands. Mac's aircraft was shot down near Uden. I arrived on the scene not long afterwards and from what I saw I was able to reconstruct what had almost certainly happened. After he had been shot down, Mac had got his first-aid kit from the back of the aircraft and had been in the act of administering morphia to his passenger when they were both killed by enemy fire. It was typical of Mac to attend to his passenger instead of attempting to save himself.

At about the same time James Stunt with the BRA (Brigadier Jack Parham) and Harry Salter with the Chief of Staff Second Army were flying north along that road and were also heavily engaged by 20mm and small arms fire between Uden and Veghel. James and the BRA managed to get through with only minor damage to their aircraft. But Harry's aircraft was so severely damaged that he had to crash land a few hundred yards from the wreck of Mac's aircraft: fortunately neither he nor his passenger was wounded...The Chief of Staff sat in a ditch and burned his

secret documents with a cigarette lighter, before he and Harry, guided by a Dutch farmer, made their way safely back to our lines.

The failure of XXX Corps to reach the 1st Airborne Division at Arnhem and secure the Rhine crossings meant that there was now no prospect of a rapid thrust into the Ruhr and an early German collapse. The Air OP squadrons resumed their normal task of observing for the artillery, a task that became increasingly difficult as winter set in.

The American Air OP pilots were also having a rough time, as the 14th Armored Field Artillery Battalion's War Diary records:

October-November: Our air OPs received concentrated and accurate 88mm flak constantly in this area, yet we did not lose a single airplane. There was a flak battery to the north of us, in prolongation of the Geilenkirchen-Ubach Road. When we crossed this road going east or west, we could expect flak. All of the pilots soon became accustomed to the gauntlet and they would approach it doing something different – diving, climbing, twisting, or turning. When the weather was good, the observers could see Cologne and Aachen, and if they could fly at all, they could see all of the enemy artillery on our front. This artillery was well dug in and very hard to silence.

October 16: (Ubach) Captain Stone was our liaison officer from XIX Corps Artillery. He was an ambitious officer, and every day or two he would return to Corps, and using one of their airplanes, he would fly a mission in our sector. On the 16th, Captain Stone was flying such a mission in an L-5 with Major Hatch, XIX Corps Artillery air officer, as pilot. The airplane was shot down by a flight of four Me 109s, which came in on the deck and made one upward pass, and both Hatch and Stone were killed. This was the type of fighter attack which the Luftwaffe used extensively later on, with some results...

During this period the OP pilots directed many shoots against enemy anti-aircraft batteries, paving the way for IX Air Force medium bombers which were attacking enemy defensive positions ahead of the advancing ground forces. They also conducted fighter-bomber strikes against enemy armour by their own P-47 Thunderbolts and RAF Hawker Typhoons.

In mid-December 1944, taking advantage of snow and fog that kept the Allied air forces on the ground, the Germans attacked in massive strength through the Ardennes, their aim being to drive a wedge between the British and American groups of armies and capture the port of Antwerp. The fighting that followed, which became known as the Battle of the Bulge, saw intense activity on the part of the Air OP pilots, often flying in appalling conditions.

'December 23: (Bulge) At about 1600, Captain Mahon, in an air OP, was investigating the Leignon-Dinant area when he discovered German armour in some woods south-west of the hamlet of Liroux. A British 11th Armoured Division reconnaissance troop had an outpost about 1000 yards from the Germans, and along the Ciney-Dinant Road. The

air OP landed by this patrol and warned them of the presence of the enemy...

December 25: (Bulge) The fighting around Celles was naturally somewhat confusing. Lieutenant Moyer, as observer in an air OP, was observing a mission in this area. He was adjusting fire on the surrounded reconnaissance and artillery elements. He could see our tanks beyond the target. When the Typhoons peeled off for their attack, Moyer and Welsh assumed they were attacking our tanks instead of the enemy. They decided to fly in front of the Typhoons in order to divert their attack. They had done this several other times, and thus prevented misdirected attacks by our fighter-bombers upon our own people. This time, much to their surprise, they found themselves in the midst of quite an air-ground battle. The enemy was firing 20mms, and the Typhoons were firing rockets. Our air OP retired in confusion to look over the situation and Moyer admitted for once the Air Force had been right while the air OP had been wrong...

It was during the fierce fighting in the Ardennes and after that the British Air OP squadrons suffered losses when aircraft were struck by shells following their trajectory to targets on the ground, a hazard experienced by air observation crews since the early days during the First World War. Major Andrew Lyall recorded that:

In...December 1944, 'C' Flight lost Ray Hill. He had been sent up to try to locate some enemy six-barrelled mortars near Venraij, when his aircraft received a direct hit from a shell. I do not know whether it was an enemy shell or one of our own. At any rate there was not very much left...

Tony Knight, who commanded 'B' Flight, lost three of his four pilots that winter. Mac was killed at Uden. Charles Ballyn was mortally wounded over the Siegfried Line. During the Battle of the Crossing of the Rhine, Peter Wykes...went up to try to neutralize some enemy self-propelled guns somewhere to the east of Rees. The smoke and haze of battle necessitated his flying over his target, whilst vast numbers of our own shells were continuously passing all around him. He was having to fly in conditions of unmitigated hell, but his duty to the infantry was imperative. His aircraft received a direct hit and he and MacNairney, his observer, were buried side by side in a little orchard close to where they fell.

In March 1945, the Allied Air OP squadrons operated intensively in support of the massive airborne operation that resulted in the Allies successfully crossing the Rhine at Wesel, their principal task being to direct artillery fire against anti-aircraft positions. Two Canadian Air OP squadrons, Nos 664 and 665, had now joined the Order of Battle in North West Europe, and were operating in support of the Canadian forces in Holland; they would be joined by a third, No 666, at the end of May, when hostilities were over.



The ruins of Hamburg, photographed by Captain Raymond Coles DFC of No 653 Squadron. Peter Coles



The end in Europe: factory-fresh Heinkel He 162 jet fighters awaiting delivery to combat squadrons that no longer existed, May 1945. Peter Coles

The *Luftwaffe* was still very much in evidence, and there were also tragic 'friendly fire' incidents, as revealed by the War Diary of 14 Armored Field Battalion.

March 2: (Germany) A counter attack in force was reported coming across the Erft Canal in the Grevenbroich area. This was miles behind our leading elements, and we sent an air OP back to investigate. It happened that Lieutenant Kistler and Moyer were the crew of this air OP, and they had an opportunity to indulge their speciality of interposing themselves between our fighter-bombers in the air and our troops on the ground. According to Moyer, the P-47s knocked out five enemy tanks and six of ours. A picture of this action appeared in an issue of LIFE with the caption that an American column shown on fire had been destroyed by the enemy. They were, in fact, destroyed by our own fighter-bombers...

March: (Rhine River) The Luftwaffe, in this area for the first time, made an organized attack upon our air OPs. Although I cannot verify the figure, I remember eleven as the number of our air OPs which were shot down in Ninth US Army by these attacks in less than a week. Compared with the number of light aircraft which were concentrated in the area, this number is insignificant. One of our own aircraft was shot down, wounding both the pilot and the observer, and we had an accurate description of the method of the attack. Lieutenant Reid, pilot, and Lieutenant Middleton, observer, were on a routine mission, patrolling the front of the 113th Cavalry Group on March 17th. The first they knew of their being attacked was when 20mm tracers struck their Cub, coming from below and behind. Reid proceeded to make a crash landing. Four Me 109s had made the pass from across the Rhine at about 50ft altitude. After the crash, the enemy fighters strafed the crashed plane on the ground. Two of these fighters were shot down by our AA fire while trying to escape.

March 31: (Across the Rhine) We began to have a surge of losses in our air OPs. We were many miles ahead of other troops in our vicinity, and the Cubs had no protection except when they were immediately over the columns. The enemy fighters downed one almost every day for a while. The exploit of Lieutenant Emerick and Captain Mahon near Ahlen demonstrates the safety of the Cub-type airplane. They were attacked by twelve ME 109s. One flight made a pass at them on the way down, and when they arrived on the deck, the twelve were coming at them from the rear in line abreast.

If they continued straight ahead, the flight immediately in rear would get a shot at them, while if they turned in either direction they would come under fire of the flights to either side. They were flying just above some small pine trees and Emerick dipped his wing into the trees. The airplane snapped over and crashed on its back. Emerick and Mahon

scrambled out and hid in an irrigation ditch while the fighters strafed the crashed plane. After the fighters left, they recovered their radio and walked across country a mile to join the column. On the way, incidentally, they picked up a German machine gun crew as prisoners.

This escape was partially miraculous, and partially attributed to the L-4. It was simple, light, and slow. There were no gadgets for the pilot to work and no problems of speed control such as there would have been if the pilot had had to work flaps. The terminal velocity of its dive was low enough so that there was no problem of killing off a lot of extra air speed near the ground. Such an escape in an L-5 would have been almost impossible. As it was, Emerick and Mahon were flying again the next day, although Mahon did complain of a stiff neck...

With the Allies across the Rhine, the German collapse was rapid, and the Air OP pilots found themselves engaged in liaison and communications duties. Germany surrendered unconditionally on 8 May, 1945.

There remained the war in the Far East, which had yet to run its course.

CHAPTER EIGHT

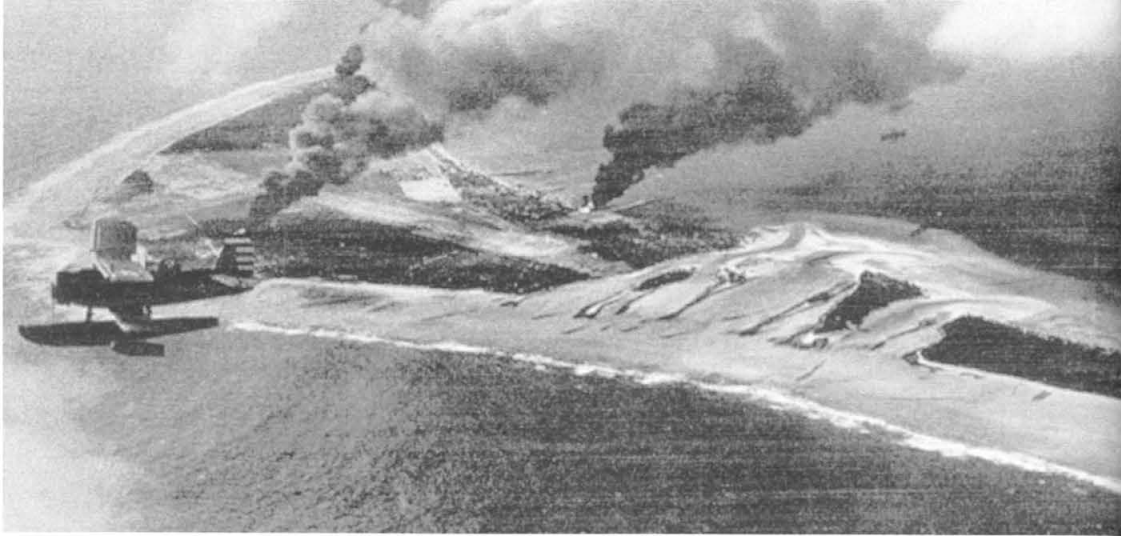
BURMA AND THE PACIFIC, 1941-45

From the very beginning of the war in the Far East, the Japanese made effective use of spotter aircraft, drawing on the considerable experience they had amassed during the war against China in the 1930s. During that conflict the principal Japanese light reconnaissance/spotter aircraft was the Nakajima E8N floatplane, which saw considerable service aboard aircraft tenders, battleships and cruisers. It was still serving in some numbers on Japan's entry into the war, and was allocated the Allied code-name Dave, but by that time it was being replaced in first-line service by two other types, the Aichi E13A1 Navy Type 0 Reconnaissance Seaplane (Jake) and the Mitsubishi F1M Navy Type 0 Observation Seaplane (Pete). It was an E13A1 that made the reconnaissance which preceded the Japanese attack on Pearl Harbor in December 1941. Only 132 aircraft were built by the parent company before production was delegated to the Kyushu firm, which produced a further 100.

It was the Mitsubishi F1M, however, which provided the primary naval gunnery AOP facility during Japan's rapid conquests in the Pacific in 1942. The F1M was the product of a 1934 Imperial Japanese Navy requirement for a short-range reconnaissance/spotter aircraft that could be catapult-launched from battleships and cruisers. In addition to its primary role of gunfire direction, it was also to be agile and well armed enough to act as a fighter if necessary, protecting its mother ship.

Mitsubishi F1M 'Pete' observation floatplane. via J.R. Cavanagh





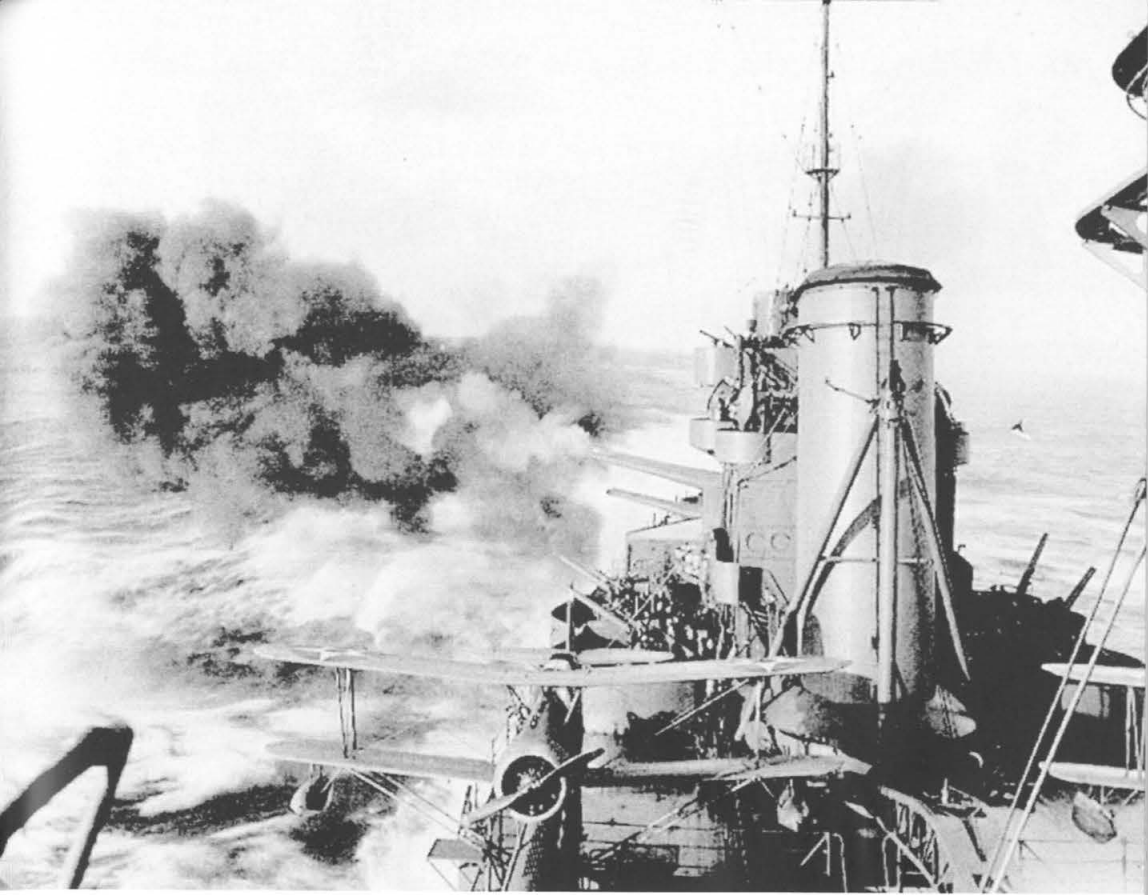
A Curtiss SOC spotter aircraft pictured during an attack by US warships on the Japanese seaplane base at Wotje, in the Marshall Islands, in February 1942.

US Navy

Mitsubishi assigned the project to a team headed by Joji Hattori, and the first prototype completed its initial flight tests in June 1936. The F1M1 was a single-engine biplane, braced with I-shaped interplane struts, although the cabane struts were of more conventional configuration. The main central float was mounted under the fuselage on a streamlined pylon, behind which were two additional supporting struts, while two stabilizing floats were installed under the lower wing. Powered by a 9-cylinder 820-hp Nakajima Hikari 1 radial engine, the plane had a two-blade metal propeller.

Although it was a biplane, the F1M1's designers paid a good deal of attention to its aerodynamic qualities, and it outperformed its main competitor, the Aichi F1A1, especially in terms of speed. The F1M1 prototype, however, suffered from a disturbing amount of instability, both in the air and in the water. After building three more F1M1s, the Mitsubishi design team decided to redesign the fuselage and enlarge the rudder area, while the wings were given more dihedral and new leading edges. A more powerful engine, the 14-cylinder 875-hp Mitsubishi Zuisei 13, was also installed, using a three-blade propeller. The revised prototype solved the stability problems, and after being flight tested in 1940, it was immediately ordered into production as the F1M2 Model 0, which accounted for most of the 1118 aircraft produced.

F1M2s from the seaplane tenders *Chitose* and *Mizuko* were heavily involved in the Japanese landings in the Philippines, carrying out strafing attacks and providing air cover for the invasion forces as well as directing naval gunfire. By this time, the F1M2 was serving on board most of the heavy units of the Imperial Japanese Navy, equipping eight battleships, nine cruisers and six seaplane support ships. The aircraft was armed with three 7.7mm machine guns and could carry 264 pounds of bombs. With army troops landed and advancing in the Philippines, the Japanese Navy moved on to the Dutch East Indies in January 1942, F1M2s from the tender *Sanyo Maru*



A Curtiss SOC on its catapult cradle aboard the cruiser USS Salt Lake City as the warship bombards Wotje Island, February 1942. US Navy

covering the landings on Borneo on the 10th. On February 2, 1942, F1M2s from *Chitose* and *Mizuho* provided the only air support for the Japanese invasion force on Ambon Island. Diving in six-plane formations to bomb and strafe the Allied artillery positions, *Chitose's* biplanes made it possible for the Japanese troops to expand their hotly contested beachhead and resume their advance. When five Allied bombers came over from the Dutch East Indies, the Mitsubishi's attacked them without hesitation, shooting down two and driving off the rest without loss. By evening, the last of Ambon's Dutch and Australian defenders had surrendered.

The most active period in the F1M2's wartime career began on 7 August, 1942, when U.S. Marines landed on Guadalcanal in the Solomon Islands. The F1M2s saw frequent action against US aircraft, and also directed naval gunfire against Henderson Field, the vital airstrip that was the key to control of Guadalcanal. The floatplanes operated from the tenders *Chitose*, *Kamikawa Maru*, *Sanyo Maru* and *Sanuki Maru*, and also from bases among the islands.

The principal aircraft used by the Imperial Japanese Army in the artillery spotting role was the Kokusai Ki-76, which, although inspired by the German Fieseler Fi 156, and bearing a close resemblance to the German machine, was



The Vought OS2U Kingfisher was designed to replace the SOC, but was not a particular success. US Navy

not a copy. First flown in May 1941, the Ki-76, known as Stella to the Allies, completed its flight trials in November 1942 and entered production shortly afterwards, seeing considerable service with artillery units until the end of the war. A few were modified for anti-submarine patrol work.

It is, perhaps, not generally known that Japan was the only belligerent to make use of rotorcraft for military purposes on anything like a large scale during the Second World War. In 1939, the Japanese Government acquired a single Kellett KD-1A autogiro and subjected it to a rigorous test programme. Afterwards, it was handed over to the Kayaba Industrial Company, who built their own version of the machine and gave it the designation Ka-1. The main design change was that the Japanese variant was powered by a 240-hp Kobe in-line engine (the Japanese version of the German Argus As.10C, built under licence) in place of the Jacobs L-4-MA radial. Two hundred and forty Ka-1s were built, the majority entering service with the Imperial Japanese Army for duty as artillery spotters and liaison aircraft. Later in the war, the Imperial Japanese Navy received a small number of Ka-1s modified to carry two 132lb bombs or depth charges. These were stationed at coastal bases on the Japanese mainland and were used for anti-submarine patrols over coastal waters.

For most of the war in the Pacific, the US Navy relied on the venerable Curtiss SOC Seagull for naval gunfire co-ordination; the aircraft designed to replace it never quite succeeded. One was the Vought-Sikorsky OS2U Kingfisher, which first flew in 1939 and which was produced in both land- and floatplane versions. US battleships and cruisers each carried two Kingfishers, each having a two-man crew comprising pilot and radioman/gunner. The Kingfisher was the world's first catapult-launched aircraft, being propelled along a 70-foot track by a gunpowder charge and becoming airborne at about 60 knots. On return, the aircraft alighted on a smooth area created in the water when the parent ship made an intentional 90-degree turn. After landing,

the pilot taxied as quickly as possible to a sled towed outboard of the stern crane. The sled dragged a net, which had to be snagged with a spring-loaded hook attached to the bottom of the aircraft's central float. The pilot would then shut down the engine while the ship's crew slung out a large hook, which the radioman caught and fastened to a sling at the rear of the pilot's compartment, allowing the aircraft to be hoisted on board and placed on its catapult cradle.

As the war progressed, the naval gunnery direction task was gradually taken over by radar, which was installed in most major US warships by late 1943, leaving the shipboard floatplanes to assume other duties such as search and rescue and target towing. The Army's light observation aircraft, however, continued with their primary task until the end of the war.

In the 'island-hopping' war against the Japanese in the Pacific, organic Army Aviation performed essentially the same missions as in other theatres, with the exception that greater emphasis was placed on the adjustment of naval gunfire. Light aircraft crews also made frequent attacks on enemy troops with hand grenades. In the Pacific, as in North Africa and Europe, Army observation pilots were also able to capture enemy prisoners on a few occasions.

In the Pacific campaigns, L-4s had to be disassembled and transported by sea; they then took off from the decks of LSTs and other types of ship and flew to the islands being invaded to adjust fire and perform other missions. When carriers were not involved in an invasion force, the L-4s usually had to land on the beaches. In some instances, wooden floats were attached to L-4s so they could land and take off from water.

Many missions that required liaison aircraft were not possible, even with the excellent short field take-off and landing ability of the L-4, without taking some extraordinary measures. To provide artillery observation during amphibious assaults, the Army employed two unorthodox methods. The first was to convert a Landing Ship Tank (LST), into a mini-aircraft carrier with a plywood runway approximately 197ft long and 16ft 5in wide, which was capable of accommodating up to ten light aircraft. These vessels saw extensive service supporting amphibious landings in the Mediterranean and the invasion of the Philippines. However, the conversion of the LSTs into a liaison aircraft carrier required considerable time and effort, and the large scale of amphibious operations meant that LSTs could not always be spared.

In an attempt to overcome the problem, Navy Lieutenant James Brodie, on assignment to the Office of Strategic Services (OSS), the forerunner of the Central Intelligence Agency (CIA), developed a system in which an L-4 or an L-5, with a hook mounted above the cockpit, could catch a trapeze bar suspended off the side of an LST or Liberty ship. The trapeze rolled along a wire suspended between two gantries that hung over the sides of the ship, and allowed the aircraft to come to a smooth stop. A similar rig allowed the aircraft to launch by reaching flying speed while suspended and then disengaging the hook. The advantage of this system was that it did not

interfere with the ship's normal operational routine. The Brodie system only saw operational service during the invasion of Okinawa, when L-4s were operating from an LST in support of the 77th Infantry Division. Lieutenant Brodie also developed a land-based version of the system, but this was never used operationally.

The success of the Army's organic Air Observation Post in the Pacific Theatre soon came to the attention of the US Marine Corps, the spearhead of all the costly assaults on the Japanese-occupied Pacific Islands. The aircraft the USMC favoured was the Stinson L-5 Sentinel, a development of the civil Stinson 105 Voyager. Substantially larger and more powerful than the L-4, the L-5 had a 185-horsepower Lycoming engine and could be equipped to carry a stretcher for wounded. The Army first procured the Stinson Sentinel in 1941, when six commercial model 105 Voyagers were purchased for evaluation in the observation and liaison roles. These six machines, which were designated YO-54, were followed in 1942 by 275 O-62 production models.

The L-5 was classified as a two-seat metal frame, fabric covered, high wing observation-reconnaissance and medical evacuation aircraft. It had a 'drop' rear seat which permitted the carriage of cargo or a stretcher, and a hinged hatch aft of the cockpit for loading. It was also fitted with brackets for a single-mount K-20 camera. The Sentinel was powered by one 185hp Lycoming O-435-I engine, fitted with a fixed pitch, two-bladed wooden propeller, 7 feet 1 inch in diameter.

When the 1st Marine Division launched the assault on Cape Gloucester, New Britain, in late 1943, its commanding general obtained ten L-4 Grasshoppers from the Army and organized their operational use with an unofficial group made up from Marine ground personnel. By this time, Marine Headquarters and Bureau of Aeronautics (BuAer) personnel had arranged to obtain seventy-two L-5s for the Marines, designated OY-1s. Earlier in the year, Vultee and Consolidated had merged to form Consolidated Vultee, and all subsequent new-design Navy aircraft acquisitions from Convair (as it came to be called) would continue the long series of Consolidated designations using the Y prefix.

As OYs were delivered beginning in October, Marine Observation Squadrons (VMO) were being commissioned as part of an Artillery Spotting Division. In early 1944 four commissioned squadrons were reorganized into VMOs 1 to 4, each to serve with a Marine combat division using eight aircraft. The Artillery Spotting Replacement Training Center at Quantico, Va., trained aircrew and ground personnel for additional VMO squadrons and combat replacements. Four more were commissioned in 1944, all deployed by spring 1945.

VMOs 2 and 4 were first to participate in a major island invasion, on Saipan in June 1944. Flown ashore from escort carriers (CVE) on D-day plus 2, the units were in the thick of the battle, sustaining many casualties; the use of OYs for casualty evacuation proved invaluable. Subsequent models had a box-type rear fuselage and revised rear cabin door, accommodating a stretcher

patient aft of the cabin.

Through the remainder of the Pacific island campaigns, VMO OYs were in the thick of the action. During the Iwo Jima invasion, OYs operated from the escort carrier *Bismarck Sea* (CVE 95). As at Saipan, losses in low-altitude spotting missions and on the ground from Japanese mortar and artillery rounds were heavy, and all but one of one squadron's aircraft surviving aircraft sustained damage.

V-J Day saw the OYs continuing to operate with Marine ground troops as they took up their occupation duties in Japan and elsewhere. At the beginning of 1946 nearly 200 of the 306 aircraft procured remained on the inventory, although many were non-operational.

Although the Royal Australian Air Force operating in the South West Pacific had no organic Air OP system as such, it used two types of aircraft very effectively in the army co-operation role. The first was the Commonwealth Wirraway. In 1939 the Commonwealth Aircraft Corporation, set up three years earlier by the Australian government to create a national aircraft industry, produced the CA-1 Wirraway advanced flying and armament trainer, a licence-built version of the North American NA-33, which was the foreunner of the T-6 Texan. The first of two CA-1 prototypes flew in March 1939, and these were followed by 755 production aircraft, the first of which entered service in June 1939. Because of its good performance and excellent manoeuvrability, the type was pressed into operational service in New Guinea in 1942, serving in the ground-attack role.

In 1941, as an insurance against being cut off from overseas help by a Japanese offensive in the Pacific, Australia accelerated its programme of developing an indigenous weapons manufacturing capability. One result was the Commonwealth CA-12 'emergency' fighter, much of which was assembled from components already in production for the CA-3 Wirraway. The aircraft, named Boomerang, first flew in May 1942, only fourteen weeks after the design had been approved, 105 production Boomerang Mk Is being followed by 95 Mk IIs. The Boomerang performed well in the support role in New Guinea, where its excellent manoeuvrability proved a major asset when attacking targets in mountainous jungle terrain. Production of the Boomerang ran to 250 aircraft. The type entered service with No 2 Operational Training Unit in October 1942 and was first used by No 84 Squadron RAAF in April 1943.

In early February 1943, during the battles around Wau in northern Papua, No 4 Squadron RAAF carried out what is essentially the first recorded Forward Air Control (FAC) mission in the history of military aviation. On the ground at Wau, troops of the Australian 2/6th Battalion and 2/5th Independent Company had made contact with a significant Japanese force. Air support was requested and in response Nos 4 and 30 Squadrons RAAF were tasked by No 9 Operational Group RAAF to carry out an attack on the enemy. No 4 Squadron was a specialist Army Co-operation squadron trained in land reconnaissance, artillery spotting, message dropping, ammunition

resupply and other general support tasks. The squadron flew the Wirraway aircraft, which was ideal for ground reconnaissance and observation. The Wirraway's very low stalling speed gave it the ability to fly so slowly that it could almost hover over the battlefield.

The Wau task was recorded as a land reconnaissance mission, though a new term—tactical reconnaissance—was created for future missions of this type. No 30 Squadron was to supply the striking power with its Beaufighter aircraft. Each Beaufighter was equipped with four 20mm cannon and six .303 machine guns, producing a heavy volume and weight of fire. The Beaufighter was one of the fastest aircraft at very low levels, in contrast to the slow Wirraway. While high speed was an advantage in many tactical situations, it was a disadvantage when visually trying to acquire ground targets for attack.

At 1320 hours the Australian Army personnel at Wau saw the 4 Squadron Wirraway circling overhead their location, and indicated their positions to the aircraft by firing flares. Once the Wirraway had determined the relative positions of friend and foe it departed and returned at 1439 with three Beaufighters in company. The Wirraway then indicated the target area to the Beaufighters by firing tracer rounds into the enemy positions and the Beaufighters then delivered their attack to the same area. All the essential elements of the FAC role were present in this mission—communication with the local ground forces, acquisition of friendly and enemy locations, and finally, the indication of the target to the attacking aircraft. After Wau this type of mission became a feature of the operations of Nos 4 and 5 Squadrons, the RAAF's two army cooperation units in the South West Pacific Area.

BURMA

Right from the outset, the Allied Command in South-East Asia was aware that the seizure of Burma by the Japanese would mean an abrupt cessation of foreign aid to China and would also give Japan a base from which to launch an invasion of India. The original Allied plan had been to provide an air defence of some 280 aircraft, and seven newly-built airfields between Mingaladon in the south and Lashio in the north were supported by a series of satellite landing strips. By December 1941, therefore, the facilities for the defence of Burma were well established; unfortunately, the aircraft that were to form the defensive and offensive capability were not.

The Allies were desperately deficient in Army co-operation and observation aircraft, and in what amounted to a desperation measure No. 4 Flight of the Indian Air Force (IAF), with four Westland Wapitis and two Hawker Audaxes, was despatched to Burma to operate from Moulmein. Four of the flight's six aircraft were promptly lost to Japanese bombing and, late in January 1942, No. 4 Flight gave way at Moulmein to No. 3 Flight, which had meanwhile re-equipped with four ex-RAF Blenheim Is. For a month, these Blenheims were to provide almost the sole air cover for ships arriving at Rangoon harbour.

On 1 February, 1942, No.1 Squadron IAF arrived in Burma with its Lysanders, flying tactical reconnaissance missions from Toungoo before

transferring to Mingaladon with a flight deployed at Lashio. IAF personnel were soon hanging pairs of 250lb bombs on each of their Lysanders and with these, flew low-level unescorted missions against the principal Japanese air bases at Mae-Haungsaun, Cheingmai and Chiangrai in Thailand. However, the Japanese advance was relentless, and with the final evacuation of Burma, No.1 Squadron personnel were flown to India, where at Risalpur in June 1942, the unit began conversion to the Hurricane IIB fighter. No 2 Squadron had also equipped with Lysanders by the end of 1941, being confined to anti-invasion exercises until, in September 1942, it also converted to Hurricanes. The third IAF unit to operate the Lysander was No 4 Squadron, formed with four aircraft on 16 February 1942. This squadron was to continue to operate the Westland aircraft until it too re-equipped with the Hurricane in June 1943.

The only RAF Air OP squadron to see active service in the Burma campaign was Major Denis Coyle's No 656, which formed at Westley in Suffolk on 31 December 1942 and, after a period of training and exercises, sailed from Liverpool on 12 August 1943, arriving at Bombay on 15 September. Or rather, the personnel arrived; it was some weeks before the first of their sixteen Auster Mk IIIs reached the theatre and were assembled, and in the meantime the squadron used Tiger Moths borrowed from the Indian Air Force.

It was soon apparent that maintaining the Austers in a serviceable condition would be a major problem. There were no Auster spares of any kind in India, the squadron's own spares having been destroyed in a fire. Nevertheless, thanks to the ingenuity of the ground crews, enough aircraft were made available for the squadron to be declared operational. Compounding the ground crews' hardships was the fact that the main batch of aircraft had been shipped to Calcutta, so that the ground personnel who were assembling them had to travel 2000 miles between jobs.

To understand the enormity of the task facing 656 Squadron, it is necessary to have an overview of the campaign as a whole. The successful campaign by the Japanese in Burma had brought their army to within striking distance of the Plain of Bengal and its teeming capital of Calcutta, but the expected invasion did not materialize in 1942, for the enemy was not yet strong enough. It was not until December that a threat began to develop.

The Allied forces in India were in the hands of two commanders of formidable reputation: Field Marshal Sir Archibald Wavell and Air Chief Marshal Sir Richard Pierce. Under the latter's direction the Air Command South-East Asia underwent a complete reorganization, and with the air defences of India growing stronger by the week, Wavell felt secure enough to launch a campaign in the Arakan, in north-west Burma, the object being to clear the Japanese from the Mayu Peninsula by thrusting towards Akyab Island. Supported by three squadrons of Hurricane fighter-bombers, this limited offensive, which began on 9 December 1942, initially enjoyed some success, the ground forces pushing 100 miles along the coast before they were halted. Large Japanese reinforcements eventually compelled a withdrawal

early in May 1943. Meanwhile, in February, the first Chindit expeditions had set out from the Naga hills in northern Burma, their objective being to disrupt lines of communication and generally sow confusion deep behind the enemy lines; the Chindit columns were supplied by Dakota and Hudson aircraft, mostly at night, and air drops continued to sustain them throughout the three-month duration of the First Chindit Expedition.

In November 1943, all Allied forces in the China-Burma-India Theatre came under the control of the newly-formed South-East Asia Command (SEAC) under the command of Admiral the Lord Louis Mountbatten. Wavell had paved the way, just as he had done for ultimate victory in the western desert, and now his successor gave the signal for the start of the second Arakan Campaign. The Japanese counter-attacked in great strength, expecting to split the British Fourteenth Army in two, destroy each half in succession and drive on into India, but their plan failed for two major reasons: first, because they committed their usual tactical blunder of relying upon the enemy to do what they, the Japanese, wished them to do, and secondly, because they had not taken into account the overwhelming air superiority now enjoyed by the Allies. Instead of falling back in disorder, as the Japanese had confidently anticipated, the Fourteenth Army dug in and fought where it stood, relying on the Allied air forces for ground support and air resupply.

On 28 January, 1944, No 656 Squadron (less 'B' Flight) went into action in support of the 5th and 7th Indian Divisions of XV Corps, having reached the Arakan by road from Deolali, near Bombay, via Calcutta, a tortuous 1500-mile road journey that took a fortnight to complete. Major Coyle set up his HQ on a convenient flat area behind 5th Indian Division and soon discovered that the Japanese were doing their best to capture it, his escape route being cut off for several days. At the same time, Captain Rex Boys of 'C' Flight established an advance party close to 7th Indian Division and set off on a reconnaissance sortie. He was shot down by Japanese fighters and crash-landed, his legs being broken in several places. His life was saved by Burmese villagers, who carried him through the Japanese lines to safety, but it was four agonizing days before he reached a hospital.

On 23 February 1944 7th Indian Division was relieved, and with it 656 Squadron. In mid-April Squadron HQ and 'C' Flight were redeployed to Kohima in the central Minipur sector, leaving 'A' Flight in support of XV Corps.

Phase One of the Japanese plan to invade India ended in failure, but this by no means deterred the enemy from launching Phase Two. On 8 March 1944, three Japanese divisions, supported by armour, attacked across the Kewaw valley and reached Tiddim, cutting the important supply route to Imphal and Kohima, bases which lay 40 miles inside India and were of great defensive importance. The enemy breakthrough at Tiddim isolated the 17th Indian Division, and to move it Mountbatten decided to commit all available reserves at Imphal. The latter were replaced by the 5th Indian Division, and to move it Mountbatten authorized the use of all available RAF and USAAF transport

aircraft. During the days that followed, although 5 Division's heavy transport and guns went by road and rail, everything else – mules, jeeps and all – was flown in.

The 5th Indian Division joined the 17th, 20th and 23rd Divisions already on the Imphal Plain, and 'B' Flight of No 656 Squadron flew in to support them. One of 'B' Flight's pilots later recorded his impression of what life was like for the Air OP personnel.

As the monsoon broke all our strips near the divisions became flooded, and we were washed out. We then had to work from the two main all-weather strips of palel and Imphal, as any bulldozed paddy field was soon a foot under water. The airlift was now on in a big way, and up to 300 Dakotas, Skymasters and Wellingtons were flying in daily. The Flight helped unload these when they were not otherwise occupied. The traffic on the two strips (later only one, as Palel came under shell fire) became intense, and it was very difficult to get a 'green' from the watch office for a mere Auster when half a dozen Dakotas were circling to come in. As the Austers were returning from shoots and information sorties there was seldom much petrol left, and often a shoot was merely suspended till the Auster could return refuelled. On one occasion a pilot returned to refuel during a registration of a target with each gun of an entire divisional artillery, but was unable to get in. He fired a red Very light at the watch office and got in but was unable to get away again. Captain Fowler stormed into the watch office, where a pilot officer told him he would have to wait until the empty Dakotas had gone. He was asked in no uncertain terms if he knew that seventy-two guns were waiting for 'that little thing', as he described it, and it was suggested that

A tactical reconnaissance Hurricane at Imphal, 1944. C.W. Gudge





TacR Hurricanes at Cox's Bazaar, 1944. C.W. Gudge



his empty Dakotas could wait. They did, and from then on the Austers had priority over all but the Spitfires on fighter patrols.

Various additional jobs were undertaken by the pilots, such as air drops of supplies to OPs on the mountain tops (two days' journey from their guns). Thousands of propaganda leaflets were scattered inviting the Japs to pack it in, and the pilots undertook map-making trips when they drew large sketches which were embellished on landing and mass produced by Corps for the infantry to use. The pilots were kept fully occupied shooting all manner of weapons on Jap positions. The gun ammunition at times was very low and so the Grant tanks were lined up and their 75mm guns used as artillery, as they had better stocks of ammunition. The search for enemy guns went on and a number of successful HB shoots were carried out, and a Jap bridge over a ravine knocked down with guns of 8th Medium Regiment.

At Kohima, 'C' Flight was involved in much the same sort of activity. The Kohima garrison was completely supplied by air; even their water was dropped by parachute. The task required great precision on the part of the transport crews, for the DZ was confined to a very small area and the Dakotas, flying at low level, had to run through intense small arms fire. Kohima was relieved in mid-June 1944 by XXXIII Corps, which then swung south towards Imphal. The siege there was also lifted in June, having lasted three months.

In June 1944, with the enemy decisively defeated on the Imphal Plain and at Kohima, the Allies turned to the offensive and there now began a great pursuit which was virtually to end in Rangoon. The rout of the Japanese Fifteenth Army was pursued right through the monsoon season, and as the Allies pushed on through the terrible Kabaw Valley, Hurricane fighter-bombers sprayed the entire path of the advance with DDT, reducing what would otherwise almost certainly have been fearful casualties from malaria.

Meanwhile, in the spring of 1944, Brigadier-General Orde Wingate and his Chindits had embarked on Operation Thursday, involving a massive airlift of 10,000 men behind Japanese lines. On 5 March, 80 Waco Hadrian gliders were towed by Dakotas from Lalaghat in Assam and cast off in the dark over two jungle clearings named Piccadilly and Broadway. Two nights later, Dakotas loaded with supplies that included mules and ponies flew into the two strips; sixty-two transport aircraft flew into Broadway while twelve gliders were towed into Chowringhee, a new strip named after Calcutta's main street. White City, Blackpool and Clydeside were familiar names given to other rough strips hacked through paddy fields and thick jungle growths, and on 23 March a Chindit brigade was flown into yet another strip, code-named Aberdeen.

These Chindit operations were supported by the USAAF's 1st Air Commando Group, which was activated in India on 29 March and which was organized to provide fighter cover, air strike forces and air transportation facilities for Wingate's forces. Among its assets were included Vultee-Stinson



A Sikorsky YR-4B Hoverfly helicopter. Sikorsky

L-1 Sentinel and Stinson L-5 light aircraft, one hundred in total. The L-1s were a valuable asset for the casualty evacuation role, each aircraft being able to carry three or four stretchers. In the first month of operations over 1000 Chindit casualties were evacuated by light aircraft, the men normally being ferried to Broadway and then transferred to transport aircraft for the flight to India.

The 1st Air Commando Group also had at its disposal four Sikorsky YR-4B helicopters, part of a pre-series batch being evaluated by the USAAF. The first helicopter operation in the China-Burma-India theatre was flown in April 1944, when an L-1 was forced down behind enemy lines with engine failure. Apart from the pilot, the aircraft carried three British soldiers, one with malaria and two with arm and shoulder bullet wounds. All four survived the forced landing, but they were in an area stiff with Japanese troops and there was no clearing where a rescue aircraft might land.

The pilot of a second light aircraft dropped a message to the stranded men, notifying them of the position of the nearest Japanese troops and advising them to make for a nearby ridge. After several hours of painful progress the small party reached this objective, where they stayed for four days and nights. Food and water was dropped to them by the Air Commando Group's light aircraft, but the condition of the wounded was becoming serious.

Meanwhile, the helicopter detachment at Lalgat had been informed of the situation, and on 21 April a YR-4B piloted by 1st Lt Carter Harman took off on the long cross-country flight to the front line in Burma. The machine staged through Hailakandi, Khumbirgram, Dimapur and Jorhat, crossing a 6000 foot mountain range on the way and reaching Jorhat shortly before nightfall.

The next day Harman flew onto Ledo and Taro, where an auxiliary fuel tank was fitted for the last and longest leg of the journey, the Aberdeen airstrip.

The flight to Aberdeen involved another trip across a high mountain range, but the YR-4B arrived safely on the afternoon of 23 April. After refuelling, Harman took off again immediately and flew to another small strip some 20 miles south of Aberdeen; the four stranded men were hiding near a paddy field 5 miles away, having descended from their ridge when they learned that help was on the way. A light aircraft circled overhead to make sure the coast was clear, then gave Harman the signal to proceed with the pick-up. The helicopter made two trips to the paddy field, bringing out one of the soldiers each time. At the small airstrip they were transferred to light aircraft, which flew them to Aberdeen.

No more rescues were made that day; the helicopter became unserviceable due to a badly overheated engine and had to be left at the advanced airstrip overnight. In the cool of the following morning, however, Harman made two more flights to the paddy field and picked up the remaining men. Later that same day – 24 April – the YR-4B flew back to Aberdeen, and during the next ten days Harman carried out four more missions, one involving the hazardous rescue of two wounded soldiers from a clearing 3000ft up on a mountainside. It was a foretaste of what the helicopter would achieve in the years to come.

Following the decisive battles of Kohima and Imphal, No 656 Squadron retired to Ranchi in eastern India to rest and refit. In September 1944, 'C' Flight left for the Arakan, and in October Squadron HQ, together with 'A' and 'B' Flights, moved back to the Imphal area in support of IV and XXXIII Corps. Considerable action was experienced by 'B' Flight, which was engaged in jungle warfare with the 19th Division until mid-December, when it moved to support IV Corps.

'C' Flight, its seven Austers working with XV Corps in the Arakan, spotted for the Royal Navy as well as land-based artillery in an Allied breakthrough that began in January 1945 with the capture of Akyab Island, which was turned into a secure base for further operations along the coast. With Akyab in Allied hands, the next step was to land a force on the Burmese mainland at Myebon, to the south-east. This objective was assaulted by the 3rd Commando Brigade under cover of a smokescreen laid by Hurricanes, the Austers of 'C' Flight subsequently spotting for the Brigade's artillery.

More island-hopping followed, which would keep 'C' Flight busy all the way to Rangoon, the Austers being fitted with long-range tanks to enable the pilots to conduct shoots with Royal Navy warships softening-up targets ahead of the advance. The capture of Ramree Island was particularly important, because it provided an ideal forward base from which to supply the Fourteenth Army by air in its offensive through the central Burmese plains. The indications were that the Japanese intended to make a firm stand at the major crossing points on the Irrawaddy River, expecting that the Fourteenth Army would engage in pitched battles at these places. The Allies, however, had other plans. While the bulk of the Fourteenth Army assaulted the Irrawaddy,

IV Corps, under Lieutenant-General Sir Frank Messervy, would carry out a great outflanking movement designed to trap the Japanese forces in the plain south of Mandalay. The primary objective was the seizure of Meiktila, and when this was in sight Messervy's corps would be reinforced by a British brigade airlifted in by US transports.

The assault succeeded, and Meiktila, with its vital airfield, was captured after a bloody battle in March 1945, the advance being ably supported by the Austers of 'B' Flight 656 Squadron. The road to Rangoon, and final victory, was now open. In no other campaign had Air OP performed under such arduous conditions, and with such magnificent dedication to the task.

CHAPTER NINE

POST-WAR TROUBLE SPOTS

The end of the Second World War did not signal an end to active duty for the air observation squadrons: far from it. Almost immediately, they found themselves on active service in various troublespots throughout the world. One of the most dangerous of these was Palestine, whose Jewish population resorted to an armed struggle in its bid to create an autonomous homeland. Attacks against British personnel and installations intensified, resulting in many deaths and injuries, and an extremely serious situation developed. Between 1 November 1945 and the end of June 1946 there were forty-seven major incidents, and the escalating acts of terrorism prompted the British authorities in Palestine to mount Operation Agatha, a very large search and cordon exercise. Beginning on 29 June, 1946, 10,000 troops and a large force of police conducted intensive searches in Haifa, Jerusalem, Tel Aviv and in twenty-five Jewish settlements.

The Austers of No 651 Squadron played a notable part in Operation Agatha. Three of its aircraft moved from Ein Shemer to Ramat David during the night of 29/30 June and began reconnaissance operations at dawn. The Royal Artillery officers piloting these Austers reconnoitred Haifa, the plain of Esdraelon and the Jordan valley while other aircraft of the same squadron, flying from Ramleh, searched Jerusalem in support of ground operations by the 6th Airborne Division. At the same time, Spitfires of No 208 Squadron covered the Nathanya area from Ein Shemer at the request of the local Army Commander. Operation Agatha was completed on 1 July, by which time the Army and police had taken 2718 people into custody and a large quantity of illegal arms and ammunition had been confiscated.

The operation, however, produced an unfortunate side effect. With a spectacular lack of awareness, the authorities had launched it on the Jewish sabbath, an action that provided considerable ammunition for the Zionist cause. On 22 July, as if to demonstrate their immunity to search and cordon operations, terrorists blew up the King David Hotel in Jerusalem, killing over 200 British, Arabs and Jews.

No 651 Squadron remained operational in Palestine until the final British evacuation in June 1948. Its last operational task was flown on 29 June, when, in the small hours of the morning, three British tanks were stolen from Haifa airport by Jews with the active assistance of two British soldiers, who deserted. A 651 Squadron Auster traced the tracks of the tanks through the Muss Muss Pass in the direction of Tel Aviv. Armed reconnaissance sorties were flown by Spitfires from Nicosia, Cyprus, aided by Fleet Air Arm aircraft

from the carrier HMS *Triumph*, but the missing tanks were never found.

Two of No 651 Squadron's flights, Nos 1908 and 1910, had already left for Fayid in Egypt in May 1948. Now, following the final British departure, No 1909 Flight went to Amman, Jordan, where it disbanded; two other flights, Nos 1906 and 1907, had been disbanded in 1947. November 1951 found Nos 1908 and 1910 Flights at Ismailia. No 651 Squadron disbanded on 1 November 1955, being re-formed as No 657 Squadron the next day at Middle Wallop, Hampshire.

One of No 651 Squadron's former flights, No 1910, had been detached to Famagusta in Cyprus in November 1951, and it was still there four years later when British forces became embroiled in a bitter guerrilla war against the Greek Cypriot underground movement Eoka, led by Colonel George Grivas. The three Austers of 1910 Flight were joined by other Austers of No 1915 Light Liaison Flight. After operating initially from the perimeter track of Nicosia airfield they moved to Lakatamia and were immediately employed in the communications, supply and psychological warfare roles. By this time, the RAF's Bristol Sycamore helicopter was in widespread use, occasioning the comment from the officer commanding the Auster flights, Major J.H. Hailes, that;

As far as light aircraft are concerned here, helicopters occupy the prima donna role; virtually anything that can be done by an Auster can be better done by a helicopter. We Auster pilots are the chorus and the remainder of the cast, and sometimes when the leading lady is overworked, we might provide an understudy. It is a real tragedy that this is yet another place where the Army is losing valuable practical experience with helicopters.

The Austers, however, were performing sterling work in Cyprus, and they were soon joined by other fixed-wing types: first the Pioneer CC.Is of No 230 Squadron, deployed from Dishforth in Yorkshire and the de Havilland Chipmunks of No 114 Squadron from Hullavington in Wiltshire. The Pioneers were assigned to an area covering the Kyrenia mountain range and Karpas, while No 114 Squadron's Chipmunks covered the western part of the island. The light aircraft were mainly used for reconnaissance to collect intelligence on the whereabouts of scattered Eoka bands, and as far as possible the pilots concentrated their missions on the same areas, so that they soon became expertly familiar with the terrain and could quickly detect any suspicious changes.

In 1958, the force of light aircraft and helicopters available to the Director of Operations in Cyprus comprised No 230 Squadron (six Pioneers), No 114 Squadron (sixteen Chipmunks), No 653 Squadron Army Air Corps (six Austers), the Joint Helicopter Unit (six Whirlwinds and No 284 Squadron (ten Sycamores). Towards the end of the year No 230 Squadron's Pioneers took part in Operation Searchlight, whose aim was to plot civilian movements and try to locate Eoka hideouts. These operations involved some very hazardous flying at 50ft (15m) above ground level in the turbulent wind conditions of



The Prestwick (Scottish Aviation) Pioneer used a variety of high-lift devices to produce outstanding STOL performance. Source unknown

the Kyrenia mountains.

The Chipmunks of No 114 Squadron also rendered invaluable service during this final phase of operations against Eoka. On many occasions, and in particular during an operation code-named Mare's Nest, experienced Army officers were carried in the Chipmunks and reconnoitred the difficult, thickly wooded mountainous country in the Troodos area. There had been concerns earlier that, because of its low-wing configuration, the Chipmunk would be less useful in the observation role than high-wing types, but these proved to be unfounded. The low-wing configuration actually proved advantageous, especially when observing the steep wooded sides of valleys.

MALAYA AND BORNEO

During operations against communist insurgents in Malaya (Operation Firedog) during the late 1940s and 1950s, target marking was undertaken by the Auster AOP 6 aircraft of No 656 Squadron, which had given such excellent service in Burma during the latter months of the Second World War and which had operated in support of South-East Asia Command forces attempting to establish law and order in the Netherlands East Indies in 1946, where revolutionary elements had proclaimed the existence of an independent state of Indonesia. In November 1946 No 656 Squadron moved to Kuala Lumpur, Malaya. Reduced to the status of a single flight (No 1914) in January 1947, it was re-formed at Sembawang with Auster AOP.5s in June 1948 with four flights, Nos 1902, 1903, 1907 and 1914. A fifth flight, No 1911, was added later.

Initially, the squadron's principal task in Malaya was visual reconnaissance, which was the most effective method of detecting terrorist hideouts. In the early weeks of the campaign, which began in 1948, this was undertaken by Dakota aircraft of Nos 48, 52 and 110 Squadrons and by the Spitfires of Nos 28 and 60 Squadrons, but by the end of 1948 most of the visual

reconnaissance task had been taken over by No 656 Squadron as its component flights became operational. The squadron's work during this period consisted of assisting ground patrols in the contact reconnaissance role and of plotting terrorist camps; the Austers also acted as spotters for a naval bombardment and on one occasion in September 1948 the crew of an aircraft of No 1902 Flight, flying in support of the 1st Battalion 6th Gurkha Rifles in the Rambat area of Perak, opened fire with a Bren gun on a band of fleeing terrorists.

No 656 Squadron's visual reconnaissance commitments increased steadily during 1949 and 1950, although communications work occupied much of its time. The gap between the two tasks narrowed in 1951, and in the following year visual reconnaissance (VR) occupied half the squadron's total task. The normal VR method employed was to scan the jungle with the aid of binoculars from a height of 3000ft (915m), the aircraft flying in a straight line so that any terrorists in the vicinity would assume that it was on a communications sortie. By 1953 the terrorists had become very nervous of air reconnaissance, and were likely to make a rapid move out of the area if they suspected that they were under surveillance, as an air strike was likely to follow quickly.

In 1954 No 656 Squadron extended its activities to marking targets and drop zones. During Operation Termite in 1954, for example, the Austers dropped smoke candles on DZs earmarked for a drop of forty paratroops of 22nd Special Air Service Regiment, who then proceeded to cut larger dropping zones into which heavy supplies could be dropped by resupply aircraft.

By the end of 1954 No 656 Squadron, with thirty-one Austers on strength, was devoting two-thirds of its sorties to the visual reconnaissance task. In the following year, however, the sortie rate began to decline for want of targets, the terrorists now having partly abandoned their policy of growing food in jungle plots. Nevertheless, between March and August 1955 the Austers located 155 confirmed terrorist camps, seventy-seven possible terrorist camps, 313 cultivations, thirty-one re-cultivations, 194 clearings that had probably been made by terrorists, and twenty-one native farms that were under communist domination.

In February 1955, Canberra jet bombers appeared in the theatre for the first time when a detachment of four B. Mk. 6s deployed to Changi, Singapore. After a period of tropical trials, the Canberras moved up-country to Butterworth in order to be closer to their designated targets. On 4 April, the four jet bombers joined eleven Avro Lincolns and twelve de Havilland Hornets in a strike on an area of jungle on the borders of Negri Sembilan and Selangor, where 200 terrorists were reported to be hiding, but subsequent operations by ground forces found no trace of the enemy.

Although the Canberra had a much higher indicated airspeed (IAS) than the Lincoln, it was found that the same techniques for attacks on area and pinpoint targets could be used without too much modification. Having received the target position as a six-figure map reference and the time on target, all further operational planning was done at squadron level, in

conjunction with the ground liaison officer, who provided the Army background, explained the need for the strike, told the crews where the enemy had last been seen, and precisely where friendly ground forces were positioned. The target position was first plotted in terms of latitude and longitude on a one-inch map of the area, then replotted on a 1:1,000,000 topographical map. The next step was to draw a circle, using the target as a centrepoint, the radius being the distance flown in ten minutes at an IAS of 200 knots/370kph (in the case of the Canberra) at 4000ft (1220m) above the target height. The direction of attack which was eventually decided upon depended on a careful study of the map features within the circle, also taking into account such factors as the position of the sun at the planned time of the attack, the position of the target in relation to high ground, and the location of friendly ground forces. The required track to be flown was plotted from a point on the edge of the ten-minute circle to the target and a number of easily-recognizable checkpoints were marked on it for the run-in.

The technique called for an Auster marker aircraft to be airborne at H hour minus ten minutes, at a point four minutes' flying time from the target, while the Canberra force was at a position where the track to the target intersected the ten-minute circle. The strike leader would contact the Auster on R/T and call three times, 'Bombing in ten', which was acknowledged. Further calls were made to the Auster at intervals, and as checkpoints came up slight adjustments were made to the timing. At two minutes, by which time the Auster was heading in towards the target, the strike leader called 'Bombing in ninety seconds'. The Auster crew then dropped a marker flare on the target and broke away at right angles to the attack. As soon as the flare was visible the bomb aimer in the lead aircraft took over and made a normal bombing run.

Also in 1955, No 656 Squadron - which recorded its 100,000th flying hour at the end of the year - flew 100 observation sorties in support of the guns of the 25th Field Regiment and the 1st Singapore Regiment, Royal Artillery, and those of HMS *Concord*, HMS *Comus* and HMS *Newcastle*, which were supporting ground forces engaged in Operation Nassau in the Kuala Langat area of Selangor.

A further important task assigned to No 656 Squadron in Malaya was psychological warfare, which had two main aims: to persuade the terrorists to surrender, disrupting their organization and spreading disaffection in the process, and to encourage the civilian population to oppose them. Some 100 leaflet-dropping sorties were flown during the first nine months of the campaign, mainly over Perak, southern Selangor and southern Johore; the leaflets dropped on these missions were primarily intended to advise the civilian population that a State of Emergency was in force. The aircraft used were mostly Dakotas of the Medium Range Transport Force, each of which carried up to 800,000 leaflets. Drops of smaller numbers of leaflets on to pinpoint targets were usually made by the Austers of No 656 Squadron, which were under the operational control of the Army formations to which the various

flights were attached.

The psychological warfare campaign reached its peak in 1955. The week following 9 September 1955, when an amnesty was declared, saw the biggest leaflet-dropping operations of the entire Emergency. In seven days, Vickers Valetta transports dropped 21 million leaflets over the jungle, setting out surrender terms, while a further six million leaflets, many dropped by Austers, carried information on surrender points and 'safe areas'. The leaflet-dropping operations were again stepped up in 1956, when it became clear that the amnesty had not produced the desired result, and 100 million leaflets were dropped in the course of the year by the Valettas of Nos 48, 52 and 110 Squadrons, the Bristol Freighters of No 41 (RNZAF) Squadron and the Austers of No 656 Squadron.

In the following year the number of leaflet-dropping sorties showed a steady decrease, for the reason that the number of terrorists remaining in the jungle was dwindling. The most intensive flying period of the year occurred between 7 and 9 September, when Valettas of the air transport support force at Kuala Lumpur dropped 8,320,000 leaflets and the Austers of No 656 Squadron a further 3.6 million, the leaflets setting out the terms of a new surrender agreement which was to remain in force until the end of the year. This operation, Greenland I, was followed by a second, Greenland II, when nearly 13 million leaflets were dropped between 17 and 21 December 1957, the latest peace offering having now been extended to 30 April 1958.

In the early months of 1958 terrorists were surrendering in growing numbers, and the success of the psychological warfare campaign led to the extension of the surrender deadline to 31 July, a further 8.5 million leaflets being dropped in Greenland III. At the same time, 2.5 million leaflets were dropped regularly each month as part of the general anti-communist propaganda offensive. Leaflet-dropping continued for some time after the Emergency had been declared officially over, and nearly one and a half leaflets were still being delivered from the air each month at the end of 1960. The total of leaflets dropped during the entire Malayan campaign reached 500 million, in the course of 2500 sorties.

Another 'PsyWar' activity in which the Austers were involved was voice broadcasting, which was closely linked with leaflet-dropping operations from early 1953. Voice broadcasting operations were carried out by 'C' Flight of No 267 Squadron, which was based at Kuala Lumpur. The flight was established with three Dakotas and two Auster aircraft; broadcast trials by an Auster had been made in January 1954 and had proved very satisfactory, the loudhailing being carried out from a height of 1500 feet (457m) at 42 knots (78kph). In November 1958, No 267 Squadron changed its numberplate to No 209. The Voice Flight continued to operate from Kuala Lumpur until January 1959 when it was decided that the Voice Flight would be moved to Penang. Because of the often dangerous flying conditions in this area, the two Austers were withdrawn at this point.

On 1 September 1957 No 656 Squadron became part of the Army Air

Corps, and by the end of 1958 only two flights of Austers were still occupied on Firedog tasks. On the Thai border, No 7 Reconnaissance Flight located a number of terrorist camps which were still occupied, and in July 1958, flying in support of the 22nd Special Air Service Regiment, provided valuable information for Operation Boulder, which was mounted east of Grik in northern Perak. No 2 Reconnaissance flight operated in support of the Police Special Branch which was rounding up terrorists in the area, and later flew from Alor Star in support of the 1st and 2nd Federal Infantry Brigades during 1959.

Of the many airfields in Malaya, only seventeen were capable of operating medium-range transport aircraft, and a great deal of the sustained transport effort during the Emergency was supported by short-range types. Of these, the most ubiquitous were No 656 Squadron's Austers, which could use all of the sixty-eight light aircraft strips which were available by the summer of 1955. The problem with the Auster was that it could carry only one passenger. If a military commander wished to take members of his staff along with him on a visit to an operational area, more than one Auster had to be provided, which imposed an unacceptable strain on No 656 Squadron's resources.

There was an obvious requirement for a multi-seat light transport aircraft, and investigations were made into the possibility of purchasing the Canadian de Havilland Beaver, but the necessary dollar funds were not available at that time. In the end the choice fell on the Scottish Aviation Pioneer, which could carry four passengers, 800lb (362kg) of freight or two stretcher cases, and which could operate from nearly all the improvised light aircraft strips in Malaya. The Pioneer had first flown in 1947, but the RAF only decided to adopt the type in 1950, when a more powerful Alvis Leonides engine became available.

The Pioneer had a truly astonishing short take-off and landing (STOL) performance and a very low landing speed of 25 knots (28mph/46kph). It went on to equip six RAF squadrons (Nos 20, 78, 209, 215, 230 and 267), about fifty being built. By October 1953, three Pioneers were in service with No 1311 Transport Flight of No 303 Helicopter Wing at Seletar, which became the Support Flight of No 267 Squadron on 15 February 1954. The squadron's Pioneer strength was later increased to eight aircraft, and by the middle of 1955 the Pioneers were regularly carrying over 500 passengers, 30,000lb (13,590kg) of freight and ten casualties into and out of jungle airstrips every month on an average of 400 forty-minute sorties. The overall task included weekly supply visits to eight jungle forts. In 1958 the squadron, having now changed its identity to No 209 Squadron, also received five Twin Pioneer twin-engined light transports.

In 1958, the Pioneer was one of three aircraft types considered as an Auster replacement by the Army Air Corps, the others being the Edgar Percival EP.9 and the de Havilland Canada DHC-2 Beaver. All three took part in the 1st British Corps annual exercise in August 1958. The Beaver was selected, the first of 42 aircraft entering service in 1961.

CONFRONTATION

In the closing months of 1962, preparations were well advanced under Great Britain's sponsorship to incorporate British North Borneo, comprising the states of Sarawak, Sabah and oil-rich Brunei, and Singapore Island into the concept of a Greater Malaysia, the aim being to bring a greater degree of independence to the remaining British territories in South-East Asia while retaining them within the British Commonwealth. The concept aroused fierce opposition from the Republic of Indonesia, whose President Soekarno had dreamed, since his accession in 1945, of bringing the Malay Peninsula, Singapore, Sarawak, Sabah and Brunei under the domination of a greater Indonesia. The focal point of Soekarno's hostility lay in Borneo, and it was in this large and underdeveloped island that the first signs of what was later to be termed 'Confrontation' first became manifest late in 1962.

In December that year, an armed rebellion broke out in the Sultanate of Brunei. It marked the beginning of four years of continuous operations in which British forces, predominantly Gurkha troops and Special Air Service, fought against Indonesian attempts to prevent the British colonies of northern Borneo being incorporated into the State of Malaysia. The principal problem facing the British was that the frontier between the northern colonies and Indonesian-controlled Kalimantan, which formed the major part of the island, was 900 miles (1450km) long, most of it enveloped in dense jungle. The border could therefore be infiltrated fairly easily at almost any point, provided the infiltrators could penetrate the jungle in the first place. Although the coastal fringes were relatively flat, there were rugged and mountainous regions in the interior, with peaks rising to 13,000ft (3965m) and frequently shrouded in mist and low cloud.

The revolutionaries in Brunei, led by a 34-year-old absentee politician named A.M. Azahari, were reported to comprise fifteen companies, each of 150 men, armed with shotguns, parangs, axes and spears. Their targets were mainly police stations, several of which were taken by surprise and overwhelmed.

At this time the Far East Air Force had a considerable number of transport aircraft at its disposal. Twelve Handley Page Hastings of No 48 Squadron, four Blackburn Beverleys of No 34 Squadron, some Pioneers of No 209 Squadron and a Bristol Britannia of RAF Transport Command were immediately assigned to airlifting an emergency force, comprising two companies of the 1/2nd Gurkhas. The Britannia flew to the island of Labuan, some 20 miles (32km) off the coast of Sabah, which the RAF used as a staging post and which had a permanent runway, while the Beverleys and Pioneers flew into Brunei civil airfield. Attempts had been made to obstruct the latter, but the obstacles had been removed by the Controller of Civil Aviation and members of the local fire brigade. The airfield was secured by the first load of Gurkhas, ninety-three troops in all.

The situation that met the reinforcement troops deployed in Brunei was confused. In the town itself the rebels had been driven out of the power

station, which they had captured earlier in the day, and attacks on the main police station, the Sultan's palace and the Prime Minister's residence had all been repulsed by police with the help of a platoon of the North Borneo Field Force, the latter having been ferried from Jesselton in a Twin Pioneer of No 209 Squadron and various light aircraft.

Elsewhere, at Tutong and Muara, the unprotected police stations had been captured by the rebels, who were in control of the towns. The police station at the important Seria oilfield was also in rebel hands. The situation here was serious, because the rebels had forty-eight European hostages and had used them as shields in an attack on Panaga police station, at the western edge of the oilfield. The attack was repulsed, but in the exchange of fire one hostage was killed and five wounded.

Later in the day the police post at Anduki and its adjacent airfield were captured by the rebels, who at once used vehicles to obstruct the airstrip. By mid-afternoon on 8 December, therefore, virtually the whole of Brunei was in rebel hands with the exception of Brunei town itself. In Sarawak, rebel forces seized the town of Limbang for a period, but were driven out by police reinforcements.

By dawn on 9 December, a tactical headquarters had been set up in Brunei town police station under Major Lloyd Williams and patrols of Gurkhas were being sent out. The Force Commander decided to give immediate priority to the relief of Seria and the recapture of Anduki airstrip; both places were reconnoitred by a Twin Pioneer of No 209 Squadron, carrying the Force Commander and the Brunei Police Commissioner. As a result of this, plans were made to land troops simultaneously at both objectives, even though rebel flags were seen to be flying over most of the area.

The troops earmarked for this operation practised rapid deplaning and were transported to the target area in five Twin Pioneers of No 209 Squadron, carrying a total of sixty men, an Army Air Corps Beaver with the Force Commander, and a Beverley of No 34 Squadron with 110 men. The Pioneers landed on a grassy area of soft ground to the west of the Seria oilfield, their wing-tips literally brushing through tree branches as they approached to land, while the Beverley made a short landing at Anduki. Its 110 troops made their exit in full battle order and the aircraft took off one minute and forty-eight seconds after landing, sustaining two hits in the rear fuselage and tail unit from rebel automatic gunfire.

Shortly before the troops flew into the area, the rebels holding Seria had telephoned the Shell Petroleum Company with a threat to use the hostages again as a screen in a further attack on Panaga police station. A Canberra of No 45 Squadron, normally based at Tengah, Singapore, but now detached to Labuan, was summoned and made a series of dummy attacks on the rebel-held police post, bringing a promise from the rebels that the hostages would not be harmed.

On 11 December the Pioneers and Beverleys flew more reinforcements into Anduki in torrential rain. The insurgents at Anduki had now been forced to

surrender and Army units closed in on Seria, an attack on this police post being planned for the 13th. In preparation for this, four Hawker Hunter FGA.9 fighter-bombers deployed from Tengah to Labuan, and prior to the attack all four made a simulated strike on the police station, one of them firing its 30mm cannon over the roof and into the sea. This was followed by a broadcast from a loudspeaker-equipped Pioneer of No 209 Squadron, urging the rebels to surrender. Immediately after the broadcast the police station was stormed by Gurkha troops, who rescued all the hostages. After this assault rebel morale fell away rapidly and other centres were quickly captured by a Royal Marine Commando and other reinforcements brought in by air and sea.

Throughout the campaign in Borneo, forward airstrips were kept supplied by Pioneers and Twin Pioneers of No 209 Squadron and No 1 Squadron, Royal Malaysian Air Force, which had also acquired a number of these valuable aircraft. In due course, the RMAF's Pioneers were replaced by the twin-engined de Havilland Canada Caribou, which had almost as good a short-field performance but many times the payload.

The Pioneer soldiered on with the Royal Air Force for some time longer, being gradually replaced by helicopters. In 1969, a flight of three aircraft was attached to No 20 Squadron at Tengah to provide forward air control facilities for the unit's Hunters, an arrangement unique in the RAF at that time.

THE MIDDLE EAST

In the immediate post-war years, the Royal Air Force played a key role in maintaining the framework of a command organization in East Africa, the Arabian Peninsula and Iraq. Among the assortment of aircraft which contributed to this were the Austers of No 1910 Flight, which in 1951 deployed to Asmara, in Eritrea, to support ground forces in action against dissident tribesmen. Austers were also employed in psychological warfare against Mau-Mau terrorists in Kenya.

In 1963 there was a major rebellion in the Radfan, 35 miles (56km) north of Aden, where dissident tribesmen, supported by the Yemen and backed by Egypt, defied the Federal Government. A State of Emergency was declared,

The Max Holste Broussard. Armand Agababian



and early in 1964 security forces, backed up by the Hunters of the Khormaksar Strike Wing, carried out a large-scale operation known as 'Nutcracker' against the dissidents. During this operation, Auster AOP.9s, Beavers and Twin Pioneers were heavily involved in flying reinforcements and supplies from Aden to the forward areas. The Twin Pioneers flew 324 sorties between 30 April and 30 June 1964, carrying 3697 passengers, 161 casualty evacuation (casevac) cases and 399,887lb (181,148kg) of freight.

France, meanwhile, had been embroiled in a savage anti-terrorist war in Algeria, which lasted from 1954 to 1956. Although the French made widespread use of helicopters such as the Bell 47 for artillery direction and general observation work, they also used fixed-wing aircraft like the Max Holste Broussard (Bushman), a robust and very effective aircraft that was roughly the equivalent of the Scottish Aviation Pioneer.

ISRAEL'S WARS

In the early months of its existence, the Israeli Air Force used a miscellany of light aircraft in the air observation role before standardizing on the North American T-6 Texan, the first examples of which were purchased in the United States and Canada in the summer of 1948. Seventeen examples were shipped to Israel in crates and after their arrival on 24 October were taken to Ekron AFB (Tel-Nof AFB today) and assembled. Operated by No 35 Squadron, the T-6s (which were known in Israel by their British name of Harvard) were used for observation, reconnaissance and light attack during the 1948-49 War of Independence. The first ten aircraft entered service during November 1948, with others following later on. The War of Independence was already nearing its end by this stage and the Harvards, flown by foreign volunteers, were used to help drive the Egyptian army out of the Negev desert in southern Israel. The Harvards played a major part in operation 'Horev', flying almost 100 sorties against various ground targets. At least two were lost, one destroyed upon landing after a bomb failed to disconnect from its pylon, and another in an Egyptian raid on Ekron AFB.

With the end of the War of Independence the Harvards were converted back to their intended role as trainers at the IAF flight school. The fourteen examples which had remained in service were joined by more bought abroad, reaching a total of sixty-five aircraft, twenty-five having been bought in France. Serving in Ekron and Ramat-David the aircraft still maintained their ground attack capabilities, a backup in case hostilities broke out again. On 5 April 1951, a Harvard was used as a forward air control aircraft, relaying instructions between Israel's Northern Command and IAF Spitfires and Mustangs attacking the Syrian police station at El-Hama, an Israeli enclave overrun by the Syrians.

Tensions in the Middle East flared up again in 1955 and these escalated a year later into the 1956 Suez Crisis. The Harvards, which in 1955 equipped a single squadron, were assigned at first to attack the Egyptian air base at El-Arish, but the presence of Arab jet fighters dictated they be given another,

safer role. Shortly before the outbreak of the crisis, in October 1956, the IAF's flight school was closed and its aircraft put on alert. During the crisis the Harvards were tasked with patrolling the Sinai and attacking any Egyptian units they could find. Only on the third day of the fighting, 31 October, after air superiority over the Sinai had been accomplished, were the Harvards assigned operational tasks. Sixteen Harvard sorties were flown on the first day in support of the Israeli Army, but the aircraft suffered severely from enemy ground fire. The squadron commander was shot down and almost all the aircraft were hit, forcing the IAF to send the Harvard only on missions where it would meet little opposition. On 1 November, the squadron flew eight more sorties in and around the Gaza strip, one aircraft being hit and forced down on Israeli territory. The Harvards returned to their training role after the end of the crisis, and served until 1961, when they were replaced by the Fouga Magister.

Another type used by the Israeli Air Force for artillery observation was the Dornier Do 27, the first ten examples entering service with No 100 Squadron at Sde-Dov in October 1964. Further deliveries after the Six-Day War brought the total number in service to thirty-five. Nicknamed Dror (Sparrow), the Do-27 could carry up to six passengers. The type's excellent STOL capabilities allowed it to perform a large number of roles, among them liaison, light observation, artillery spotting and maritime patrol. The aircraft were routinely used in operations against Palestinians infiltrating into Israeli territory from Jordan in the late 1960s, spotting and tracking infiltrators while also coordinating the actions of IDF troops on the ground. The Dror's front-line role resulted in the loss of a number to enemy fire. During artillery exchanges between Egyptian and Israeli troops on the Suez Canal on 8 March 1969, an Egyptian SA-2 shot down one of the Do-27s. Both the pilot and observer on board managed to bale out and were picked up by Israeli forces, but the ongoing fighting prevented their evacuation to hospital and the pilot, Ehud Ben Arie, died of his wounds. Another Dror was shot down by a Syrian missile on 11 October 1973, during the Yom Kippur War, while on observation duty over the Golan Heights. The pilot, Captain Yaacov Bitzur, and the two observers were killed. A third aircraft was lost to friendly fire in 1969, being shot down in error by an Israeli Hawk missile battery. The Do 27s were retired in 1981, by which time the Israeli forces were relying increasingly on unmanned aerial vehicles (UAVs) for surveillance and gunfire control.

CHAPTER TEN

KOREA 1950-53

On Sunday, 25 June 1950, the North Korean Army invaded South Korea, the infantry assault heralded by a fierce artillery bombardment and led by squadrons of Russian-built T-34 tanks. The breakthrough was achieved quickly, and while the tanks rolled on towards their first objectives, Kaesong and Chunchon, more North Korean troops, including marines, were landed at Kangnung, on Korea's east coast, by an armada of small craft. By 0900 Kaesong was in North Korean hands and the seaborne columns were pushing steadily inland to link up with the forces that had crossed the 38th Parallel.

The North Koreans' choice of a Sunday morning for their invasion of the south was not accidental. Shrewdly, their military commanders had reasoned that any possible American response would be at its lowest level on a Sunday, with many military personnel absent on weekend leave. After all, there had been a precedent – the Japanese attack on Pearl Harbor less than a decade earlier, which had caught the main American base in the Pacific completely off balance.

In 1950, the formation best placed to mount a military response against North Korea was the United States Fifth Air Force, which, based on the Japanese Home Islands since 1945, formed the front line of America's air defences in the Far East against the potential air threat from the Soviet Union. The backbone of Fifth AF's defensive capability was the Lockheed F-80C Shooting Star fighter-bomber, which equipped the 35th Fighter Interceptor Wing at Yokota, near Tokyo, the 68th Fighter Bomber Wing at Itazuke Air Base on Kyushu, and the 49th Fighter Bomber Wing at Misawa on northern Honshu.

One of the first units to see action against the invaders, however, comprised ten worn-out North American P-51 Mustangs, supplied to the Republic of Korea (ROK) at the request of President Syngman Rhee and based at Taegu. This unit, manned by ROK and American personnel under the command of Major Dean Hess (whose story was later to become famous through the book and film *Battle Hymn*) was in action almost continually during the early days of July, although its effectiveness was hampered by the fact that many of the ROK pilots lacked sufficient experience to handle the F-51 properly and also by the lack of a suitable tactical air control system.

On 9 July, as a first step towards remedying this situation, three Stinson L-5G observation aircraft and seven officers were deployed to Taejon and began flying forward air control missions. They were followed, the next day, by a North American T-6C. Assigned to the 35th Fighter Interceptor Group in Japan, this aircraft had been grounded for over a year; hastily brought up to airworthy standard, it was fitted with an AN/ARC-3 radio for

communications with both ground forces and fighter-bombers. On the first day of operations, its crew, Lts James Bryant and Frank Mitchell, sighted a column of forty-two enemy tanks on a road near Chochiwon and called in an F-80 strike, which destroyed seventeen of the AFVs. As more T-6s arrived, they were assigned to the 6132nd Tactical Air Group at Taegu; three weeks later, HQ Fifth AF activated the 6147th Tactical Control Group (Airborne), which assumed responsibility for all FAC operations. By the end of July, when the T-6 unit comprised twelve aircraft and twenty-five men, it had flown 269 sorties across the whole breadth of the battlefront, operating under the call sign 'Mosquito'.

Of all the aircraft types operated by the United Nations in Korea, the most hated and feared – if the statements of captured enemy soldiers were to be believed – were the Mosquitoes, the T-6, L-17, L-19 and L-20 tactical control aircraft. The sudden appearance of one of them, popping up briefly from behind some feature of the terrain, was invariably the prelude to an air strike or artillery bombardment, and the communists went to great lengths to shoot them down.

From 25 January 1951 the Mosquitoes operated at maximum effort in support of Operation Thunderbolt, the US Eighth Army's 'reconnaissance in force' towards the Han river. Throughout the operation the 6147th Tactical Control Group flew from the primitive forward airstrip at Taejon, which permitted its aircraft to patrol the battle area for three hours. In addition to its complement of T-6s the 6147th Group also had at its disposal two C-47s which, orbiting on station about 20 miles behind the front, relayed messages between the airborne controllers, ground attack aircraft and the Tactical Air Control Centre. For direct communications with ground forces, each Mosquito carried an SCR-300 infantry transceiver. Later, when the Group received TG-6G aircraft, re-manufactured and purpose built for the TAC role, AN/ARC-3, AN/ARC-6 and SCR-522A radios were fitted, enabling the crews to communicate over a much wider spectrum. The T-6G was equipped with six underwing rocket racks carrying triple rocket launchers and armed with two 0.30 calibre machine guns in underwing pods, although the latter reduced the aircraft's speed to an unacceptable degree and were later removed.

The 6147th Group had three component squadrons. Two of them, the 6148th and 6149th TCS, were airborne; the third, the 6150th, took care of ground support, which included the tactical air control parties which used radio-equipped jeeps to call in air strikes. Every new Mosquito pilot was required to serve sixty days with one of these ground teams. The two airborne squadrons divided Korea up between them, the 6148th covering the western sector and the 6149th the eastern part. At least one Mosquito was kept airborne over each sector during daylight hours. As the ground war developed into a stalemate the Mosquitoes carried out long-range reconnaissance missions along known enemy supply routes. On one of these, in the summer of 1951, Lt Richard Meade was attacked by a Yak-9 fighter, which tried hard to get on his tail. Meade used the T-6's much tighter turning

ability to good advantage, however, and it was the Yak that ended up in front. Meade let fly a salvo of smoke rockets at it, whereupon the enemy pilot gave up and flew off to the north.

During the spring of 1951, having observed the effectiveness of the Mosquitoes at first hand, the British Commonwealth Division in Korea made repeated requests for the establishment of its own observation aircraft units. The first of these, No 1913 Light Liaison Flight, was formed at Middle Wallop in June 1951 with Auster AOP 6 aircraft. These were shipped in crates to Iwakuni, where they were assembled and delivered to airstrips in the Commonwealth Division's area. A second unit, No 1903 Independent Air Observation Post Flight, arrived in Korea in October 1951. Although Royal Air Force units – the only ones, in fact, to operate from Korean soil – the two flights were manned almost exclusively by Royal Artillery personnel, as before.

Although No 1913 Flight's main task was liaison, its Austers undertook visual reconnaissance missions from the moment they arrived in Korea, penetrating up to 4 miles into enemy territory. Pilots normally flew with one ear uncovered so that they could hear the crackle of enemy bullets passing dangerously close and take evasive action. The Flight also possessed one Cessna L-19, on loan from the Eighth Army for use by the GOC 1st Commonwealth Division; the British pilots pronounced the L-19 superior to the Auster in most respects.

The principal role of No 1903 Flight, which as part of No 656 (Army Co-operation) Squadron had seen service against communist terrorists in Malaya before reaching Korea via Hong Kong, was counter bombardment – in other words, locating enemy gun positions and assisting friendly artillery to engage them. For this dangerous task the Austers' cockpits were armour-plated and the pilots flew solo, carrying parachutes. A daily average of seven sorties was

An Auster AOP.6 over the rugged terrain of Korea. Author's collection





A Cessna L-19A. (O-1E) Bird Dog. Cessna

flown, with each pilot putting in about 45 hours' flying in the course of a good month. Most sorties were flown above 5000 ft to escape the worst of the small arms fire and light flak, as well as to avoid the trajectories of artillery shells. Australian and Canadian pilots were also attached to the British AOP flights.

US Marine Corps units fighting in Korea called on the services of Marine Observation Squadrons One and Six (VMO-1 and VMO-6), equipped initially with Convair OY-1 Sentinel observation aircraft and, from May 1951, with the Cessna OE-1 (L-19A). Thirty-five of these aircraft were borrowed from the Army, which had taken delivery of the L-19 in December 1950 under the designation O-1A Bird Dog. The L-19A was the most prolific of all the Bird Dog variants, with production eventually running to 2578 aircraft. The type was also supplied to France, which used it in Algeria, and Canada. The Bird Dog was an extremely robust and reliable aircraft in February 1952, to give just one example, an L-19 was hit by enemy anti-aircraft fire at an altitude of 6000ft. Twelve feet of the right wing was shot off but the pilot and observer regained control and miraculously landed the aircraft at an Air Force base. Within three hours, a new right wing had been installed and the pilot was able to fly it out to another air base for further inspection and repair.

For the first five months of the Korean War no helicopters of any kind had served under Army command; patrol, observation and rescue work was carried out by light aircraft, mostly Piper L4s and Stinson L-5s. The pilots of

these aircraft, many of which had seen service in the Second World War and were rapidly approaching the end of their useful lives, did a magnificent job under incredibly arduous conditions, but their task was hampered by a high unserviceability rate and by the inability of the light aircraft to land where they were most needed. Nevertheless, many Allied pilots owed their lives or their freedom to them. The first Army helicopters did not arrive in Korea until late in December 1950.

They were Bell H-13s (Bell 47s), two-seat machines which, although destined for the liaison and artillery spotting roles, had a limited casevac capability. Four H-13s equipped the 2nd Army Helicopter Detachment at Seoul and began operations in January 1951 under the command of Captain Albert Seburn. Despite the fact that the H-13 could carry only one casualty, the Detachment had evacuated more than 500 casualties from the battle area by the end of the month, a feat that earned each of the four H-13 pilots the Distinguished Flying Cross. In February 1951 the H-13s were joined by a small number of two-seat Hiller H-23 Ravens, and in the months that followed both types were used increasingly for battlefield surveillance.

Although the United States Army turned increasingly to the use of helicopters to fulfil the air observation role in the 1950s, the British Army saw a continued need for fixed-wing observation aircraft, with results that we have already seen in various operations overseas. At home, No 657 Squadron used a mixture of Austers and Hoverfly helicopters until 1955, when it was renumbered 651 Squadron, while Nos 661, 662, 663, 664 and 666 all reformed as Auster AOP units within the framework of the Royal Auxiliary Air Force, disbanding in 1957. Today, most of the old AOP squadron numberplates are retained, but the Army Air Corps is wholly a rotary-wing force, and its helicopters are dedicated to attack rather than observation.

CHAPTER ELEVEN

VIETNAM

The first fixed-wing Air Observation Post aircraft to be used in the protracted conflict in Vietnam was the well-tried Cessna L-19 Bird Dog, which carried the revised military designation O-1 from 1962. The US Marine Corps' OE-1s and OE-2s became O-1Bs and O-1Cs respectively. The type proved to be an excellent Forward Air Control aircraft, and although the USMC observation squadron, VMO-6, initially preferred helicopters for the FAC role, by 1967 the effectiveness of the O-1s for Marine ground fire support was recognized and VMO-6 began using O-1Cs in combat. Eight O-1Gs (Army O-1As modified for FAC use) were obtained to augment the remaining O-1Cs. FACs would spot and mark targets with the O-1s' smoke rockets for destruction by attack aircraft. The O-1 also served in a similar capacity with the Republic of Vietnam Air Force.

As the ground war intensified, however, and North Vietnamese surface-to-air weapons became more effective, the need for attack-capable FAC aircraft was met with armed UH-1Es and new joint service North American OV-10s

The Cessna O-2 gave excellent service in Vietnam in the Forward Air Control role. This example carries the markings of the Iranian Air Force. Cessna



and Cessna O-2s (Cessna Model 337 Super Skymasters). Marine O-1 combat losses were not replaced, and by 1969 O-1s were being withdrawn from Vietnam. The last Marine Bird Dogs were transferred to Futenma, Okinawa, and retired there in 1970.

The O-2, which was readily available for military operations, evolved from the Cessna Model 336, which was destined to provide twin engine capability for single-engine qualified pilots. A major difficulty in going to two engines was asymmetric handling, which is controlling the aircraft at low speed and altitude with one engine shut down. Cessna sidestepped this by putting the two engines of the Model 336 in tandem, one in front and one behind the cabin, which was supported beneath the wing between the tail booms. However, although the design was distinctive, it proved to be underpowered, and after Cessna built 195 examples they replaced the Model 336 with the very successful Model 337 Super Skymaster or O-2A. The design remained the same, but it had two 210hp instead of 195 hp engines, retractable rather than fixed-landing gear, a cabin seating six rather than four and turbo charging and cabin pressurization available as extras. For use as an FAC aircraft, the Air Force added windows and wing hardpoints for 7.62mm miniguns, bombs, rockets and flares. An O-2B version for psychological warfare had loudspeaker and leaflet dropping capabilities.

The O-2 could remain airborne for about four hours using both engines and seven hours on one engine by switching fuel tanks. It had a top speed of 205 mph and a ferry range of 1,400 miles, reducing to 770 miles with an 830lb payload. The aircraft had dual controls with the pilot and co-pilot or observer seated side-by-side. Production ended in 1970, after 546 O-2s had been built.

FAC pilots were enthusiastic about the O-2's twin-engined layout, but at heavy operating weights and high temperature conditions, with an engine out the aircraft necessitated careful handling. Because of the aerodynamics of a pusher propeller, the O-2 performed better on the rear engine alone than on the front one.

The most significant modification of the civilian Model 337 to the O-2A was the addition of armament. The O-2A could carry a selection of offensive weapons, including the 7.62 mm Minigun pod (small Gatling gun), but the normal load was two LAU-59/A rocket pods with seven 2.75in FFAR (Folding Fin Aircraft Rockets) each. These rockets could be armed with a variety of explosive warheads, but white phosphorus (WP or 'Willie Pete') heads were usually fitted. The WP round exploded with a highly visible puff of white smoke which made it useful for marking targets for attacking fighter-bombers, particularly under the jungle canopy. An armament control panel and a gun sight were added to the instrument panel to complete the offensive armament suite. Most FACs found that a grease pencil mark on the windshield was just as accurate as the gun sight for aiming a WP marking rocket.

Another change from the civilian model was the addition of an enhanced communications and navigation suite on the O-2A. The aircraft carried three radios: a UHF set for coordination with tactical aircraft; an FM radio to talk

to the troops on the ground and a VHF radio which was used to communicate with the tactical air control party (TACP) for requesting air support, clearing targets for strikes and other command and control functions. Most pilots who had flown the O-1 prior to the O-2 felt that the main drawback of the O-2 was the arrangement of the windows. Having the pilot seat on the left side of the aircraft rather than the centreline as in the O-1 tended to reduce the visibility from the cockpit of the O-2. The extra glazing on the right door and forward fuselage was an attempt to improve visibility to the right, but it was not very effective, particularly when carrying someone in the right seat. As a result, O-2 FACs tended to prefer left turns for better visibility, a dangerous habit to develop in combat. Also, the main window on the left (pilot's) side of the aircraft did not open. This did not help ventilation in the cockpit and made it harder to hear ground fire. The Air Force made an attempt to develop a tandem seat O-2 with a narrower fuselage, but this never proceeded beyond the mockup stage.

By the middle of 1966 the USAF had four Tactical Air Support Squadrons in Vietnam (19th at Bien Hoa, 20th at Da Nang, 21st at Nha Trang and the 22nd at Bin Thuy) plus one in Thailand grouped under the 504th Tactical Air Support Group. There were 250 FACs in Vietnam in these units but by the end of 1967 the number of FACs had doubled and were flying as many as 10,000 sorties per month.

The other twin-engined FAC aircraft used in Vietnam was the North American (Rockwell) OV-10 Bronco. In August 1964 it was announced that North American Aviation had won a US Navy competition for a light-armed reconnaissance and counter-insurgency aircraft. Originally designated NA-300, the first of seven prototypes flew on 16 July 1965 as the YO-10A Bronco, powered by two AirResearch T76 turboprop engines. The first production OV-10As entered service with the US Marine Corps and the USAF in 1968 and by the following year 270 were in service, many being employed in Vietnam for light-armed reconnaissance, helicopter escort and forward air control. The type could also act in the ground-support role as a stop-gap until the arrival of tactical fighters.

The first USAF OV-10As destined for combat arrived in Vietnam on 31 July, 1968. A total of 157 OV-10As were delivered to the USAF before production ended in April 1969. Each of the Marine Corps' two observation squadrons had eighteen aircraft, nine OV-10As and nine OV-10Ds night observation aircraft. There was also a Marine Air Reserve squadron. The OV-10 was phased out of the Marine Corps in 1995. The OV-10 Night Observation Gunship (NOGS) was a USMC OV-10A modified to include a turreted FLIR (Forward Looking Infra-Looking) sensor and turreted M-197 20-mm gun slaved to the FLIR aimpoint. Successful in combat in Vietnam, NOGS evolved into the NOS OV-10D, which included a laser designator.

One OV-10A pilot in Vietnam was awarded a posthumous Medal of Honor. He was Captain Steven L. Bennett, whose lost his life during the major communist offensive of 1972. At this time, support for the Vietnam War was

at its lowest ebb in the USA, and the North Vietnamese, emboldened by the decline of US support, launched their March 1972 Easter offensive. The main thrust was in the US I Corps area, where some 30,000 North Vietnamese troops supported by tanks and artillery were massed along the DMZ. They rapidly overran the South Vietnamese Army's (ARVN) 3rd Division, capturing Quang Tri. In May the ARVN counter-attacked, moving back toward Quang Tri along SAM-7 Alley where shoulder-held, heat-seeking anti-aircraft weapons were taking a heavy toll on low-and-slow US and VNAF aircraft.

On 29 June, Capt. Steven L. Bennett of the 20th Tactical Air Support Squadron at Da Nang, the pilot of an OV-10 forward air control aircraft, had been marking targets for friendly forces. In his backseat was Marine Corps Capt. Mike Brown, calling targets for the guns of Navy ships in the Gulf of Tonkin. Bennett had been in Vietnam for less than three months. Brown, a company commander stationed in Texas, had volunteered for Vietnam duty and was versed in laying fire for Navy guns that had a flatter trajectory than those of the Army. Bennett's citation reads:

Capt. Bennett was the pilot of a light aircraft flying an artillery adjustment mission along a heavily defended segment of route structure. A large concentration of enemy troops was massing for an attack on a friendly unit. Capt. Bennett requested tactical air support but was advised that none was available. He also requested artillery support but this too was denied due to the close proximity of friendly troops to the target. Capt. Bennett was determined to aid the endangered unit and elected to strafe the hostile positions. After four such passes, the enemy force began to retreat. Capt. Bennett continued the attack, but, as he completed his fifth strafing pass, his aircraft was struck by a surface-to-air missile, which severely damaged the left engine and the left main landing gear. As fire spread in the left engine, Capt. Bennett realized that recovery at a friendly airfield was impossible. He instructed his observer to prepare for an ejection, but was informed by the observer that his parachute had been shredded by the force of the impacting missile. Although Capt. Bennett had a good parachute, he knew that if he ejected, the observer would have no chance of survival. With complete disregard for his own life, Capt. Bennett elected to ditch the aircraft into the Gulf of Tonkin, even though he realized that a pilot of this type aircraft had never survived a ditching. The ensuing impact upon the water caused the aircraft to cartwheel and severely damaged the front cockpit, making escape for Capt. Bennett impossible. The observer successfully made his way out of the aircraft and was rescued. Capt. Bennett's unparalleled concern for his companion, extraordinary heroism and intrepidity above and beyond the call of duty, at the cost of his life, were in keeping with the highest traditions of the military service and reflect great credit upon himself and the U.S. Air Force.

Royal Australian and Royal New Zealand Air Force pilots also flew many FAC missions in Vietnam. In 1967 an agreement between the USAF and RAAF

increased the number of RAAF pilots to three, all assigned to the 19th Tactical Air Control Center, South Sector (TASS) and embarking on a six-month tour of duty (later increased to eight months). The RAAF FACs retained their uniform, flew USAF marked aircraft, were administered and paid by their own service with the Seventh AF responsible for their health, welfare and duty assignment. From June 1969 the number of RAAF FACs was doubled in response to a Seventh Air Force request for more, but in April 1970 it was cut back due to RAAF fighter squadrons being undermanned in Australia. The RAAF FACs were withdrawn in December 1971. A total of thirty-six RAAF pilots had served; fifteen won the DFC, two received the DSO and a further six were mentioned in dispatches.

Vietnam was not quite the end of the fixed-wing air observation and forward air control aircraft. In 1991, the US Marine Corps operated the latest version of the Bronco, the OV-10D, in Operation Desert Storm, designed to drive Iraqi forces from Kuwait. Two aircraft were shot down by heat-seeking missiles, one crew member being killed and three captured.

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